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The Incidence of "Jake" Paralysis in Oklahoma*

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ON February 28, Dr. Earl T. McBride of the McBride Reconstruction Hospital, Oklahoma City, called to ask if we would check his laboratory in the examination of the spinal fluid from two patients who had come to his hospital showing a peculiar paralysis. He stated that there was some resemblance to both anterior poliomyelitis and Landry's disease, but that there were additional features in both cases, characteristic of neither. In both the spinal fluids were negative.

About the same time Dr. W. H. Miles, Oklahoma City Health Officer, and Dr. E. Goldfain, an associate of Dr. McBride, investigated some 60 cases which came to the attention of the City Health Department. It was found that in every instance the condition affected those living in or frequenting the same section of town; that this section was the location of certain drug stores which were suspected of violating the prohibition laws; and it was significant that a number of their employees, and one or two proprietors were afflicted. Careful investigation revealed that the only etiological factor common to all of these cases was a history of habitual indulgence in "Jake."

To Drs. Miles and Goldfain credit should be given for the first indictment against fluid extract of ginger as the causative agent. A number of the druggists selling this product had been visited by federal agents and samples of the fluid extract picked up for analysis. Ordi-

* Read before the Epidemiology Section of the American Public Health Association at the Fifty-ninth Annual Meeting at Fort Worth, Tex., October 29, 1930.

nary methods showed them to be standard in every respect, but more careful analysis revealed them to be low in ginger extractives. After the appearance of these cases samples were again obtained and analyzed for heavy metals. It was at first announced that the paralysis was due to lead poisoning. The mistake made was in the finding of a so-called "passive" sulphate of iron which precipitated out after sulphuric acid digestion and returned to solution quite slowly.

The authors felt quite certain that the clinical symptoms were not due to lead, and I believe the case histories given here will bear us out. Preliminary chemical work was started, details of which will be given later.

In the meantime numerous facts of interest began to come to light. Cases were reported from other sections of the state. On April 1 cards were sent to about 2,500 physicians in the 77 counties of the state. On April 23 approximately 40 per cent of these had been returned and showed 536 cases in 39 counties. Because of the tendency to be ashamed of the affliction it is safe to assume that this number represents only about one-third of the cases and that there are therefore between 1,500 and 2,000 in the state. Reports and inquiries began to come in from all sections of the country, notably, Alabama, Mississippi, Georgia, Kentucky, Tennessee, South Carolina, North Carolina, Louisiana and Ohio. Different theories were developed as to the cause, all of which broke down under investigation.

Three instances suffice to show how each additional report strengthened our belief in the fundamental truth of our own theory. From Tulane came the report that a physician who was treating several such cases had become paralyzed himself. He denied ever having used "Jake" and the inference was naturally drawn that we were dealing with some type of low grade infection. The cat escaped from the bag when the patients stated that the doctor had purchased his ginger from the same source as themselves. Again—

> The connection of fluid extract of ginger with these cases is being generally definitely established, though there have been some instances where the use of ginger extract has been denied. One such case was the superintendent of a mill in Georgia who was affected with the paralysis, which the doctor diagnosed as the result of ginger drinking, though the patient denied it. The doctor, however, confirmed his diagnosis by means of a ruse, telling the patient's wife that he was writing out a prescription which might be of benefit, but if he had been drinking ginger extract not to give it to him as it might produce fatal results. The patient then announced he would not use the prescription.[1]

Finally, there is the instance of the girl whose mother gave her half

an ounce of fluid extract of ginger to relieve the pains of dysmenorrhea and who later developed the paralysis.

After becoming convinced of the fact that ginger extract was the causative agent we began to cast about for the ingredients at fault. Numerous statements appeared, all of which were considered carefully before being discarded. Among them were the following: that lead or some other of the heavy metals were to blame; that the paralysis was due to water passing through deposits of bauxite; to a fungus growth on the ginger; to another root closely resembling ginger but containing a toxic alkaloid; to use of ginger which had been redistilled, thus rendering the product toxic.

The application of cold reasoning ruled out most of the above, and chemical analysis eliminated the rest. The reasoning followed was based on the fact that the condition made its appearance nearly simultaneously in widely separated parts of the country, that cases originated only during a very brief period of time (no new cases are being reported); that in all the centuries during which ginger in various forms had been used as a condiment, seasoning, flavoring material, confection, or drug, no record of a similar outbreak could be found.

All of the above points led to the assumption that some new adulterant was being used in the preparation. That there was reason for suspecting this is supported by the fact that standard preparations of ginger contain such a quantity of ginger extractives that extreme dilutions are necessary before the fluid becomes potable, and such dilutions reduce the alcoholic content until the desired "kick" cannot be obtained. The first adulterant suspected was iso-propyl alcohol. This was found in varying quantities in several samples, but the findings of others[2] convinced us that this was in no way concerned unless there was a chemical combination with some of the ginger extractives. Animals were therefore fed fluid extracts made of African and Jamaica ginger, using as a menstruum ethyl alcohol denatured with 1 per cent iso-propyl. Dogs fed 1 oz. of the above preparations showed no symptoms after from 6 to 10 weeks.

During the course of these experiments, the first autopsies on cases of ginger paralysis were held.

Case I. Male, white, age 68, laborer. Had been heavy consumer of alcohol all his life. No history of venereal disease. No Wassermann. Developed a well marked case of "Jake" paralysis, following debauch. Came into hospital with cough and lung symptoms premonitory of pneumonia, and general malaise. Râles in bases of both lungs. Blood pressure not obtainable because of arteriosclerosis. On the third day he developed stertorous breathing and other symptoms of brain pathology. He died about 48 hours later.

Autopsy showed generalized arteriosclerosis. Some pulmonitis but no definite

pneumonia. Liver somewhat retracted, slightly nodular, darkly mottled. Kidneys not remarkable. Brain described as water-logged. Spinal cord and sciatic nerve, no gross pathology. Cause of death, cerebral edema.

Microscopic sections of the organs showed nothing remarkable. First examination of the material from the nervous system was made by Dr. H. G. Jeter, who reported cellular exudate in some of the fibers of the cauda equina as the only lesion found, and on this basis made a diagnosis of perineuritis. Sections were run by the routine histological methods.

In this laboratory the material was run through special neurological methods using sudan IV-hematoxylin, toluidin blue, and osmic acid stains.

Sudan IV-Hematoxylin. Lower lumbar cord. (1) Brownish red granules packed in marginal area in all nerve cells of the anterior horns. Similar brownish granules in some cells of dorsal horns. (2) Karyolysis, either breaking up of nucleolus—condensation of karyosomes, or complete lysis of karyotin material with disappearance of nucleolus. (3) Migration of the nucleus in many cells. Edema and lymphocytic exudate around the neural canal, desquamation of neural canal epithelium.

Toluidin blue stain shows presence of tigroid bodies—but with frayed margins—in all cells containing a nucleus in good condition, except in regions of the cell occupied by granular material described above. This type of pathological condition of nerve cells was also found in the upper thoracic, lower cervical cord, medulla including the inferior olive, nuclei of the floor of the fourth ventricle at this level, and the dentate nucleus.

Osmic acid-Mueller stain of material from the same regions revealed black granules in all places where Sudan IV had shown brownish red granules.

Marchi stain of the sciatic nerve showed (a) in cross sections some fibers in every fascicle which stained black; (b) in longitudinal section, some fibers were all black, others showed black masses at the nodes of Ranvier, or scattered along in the internodal spaces.

The exudation around the neural canal was found at all levels of the cord examined, but not in the region of the fourth ventricle.

Case II. Male, white, age about 70. Always used alcohol. No history of venereal disease. No Wassermann. "Jake" paralysis, or locomotor ataxia. Came into hospital in semi-comatose condition. Died after short stay. Diagnosed possible uremia.

Autopsy revealed aneurism of ascending aorta, atheromatous aorta, and arteriosclerosis. Other organs not remarkable. Complete central nervous system removed together with sciatic, anterior tibial, part of brachial plexus, and radial nerves. No gross pathology evident except probable swelling of anterior tibial nerve. The special staining methods used in Case I showed identical pathology of nerve cells and fibers with that case.

It occurred to us that if the pathology is due to "Jake," and it has, as in Case I, reached the vital centers, the symptoms and death could be due to the changes described above. The symptoms would be those involving the failure of the vital centers, and death from "Jake" is possible.

Since the microscopic findings in the above cases seemed to us to

be unique, and—with only 2 cases autopsied—characteristic, we set about to determine, if possible, the causative agent. On April 25 one of the authors (D. T. B.) visited L. T. Hoyt, Chemist in Charge Federal Prohibition Laboratory at New Orleans, La., where he learned that some samples seized had shown the presence of a phenol compound which had not been positively identified but was thought to be tricresyl-phosphate. Analysis up to this time, by the methods of Fuller and Authenreith & Warren, had failed to disclose anything unusual. This may have been due to the fact that the samples analyzed by us had actually not contained the adulterant. Taking advantage of the findings of Mr. Hoyt, an attempt was made to isolate and identify the phenolic substance suspected. No tests could be found in the literature available, and after some experimentation the following procedure, modified from Fuller, was adopted:

Sixty c.c. of the fluid extract of ginger was placed in a small distilling flask, connected with a condenser and placed in a water bath. The alcohol was distilled and collected for examination. The residue was diluted with water, transferred to a separatory funnel and extracted with ether. The ether solution was then extracted with a 5 per cent alkali solution, washed with distilled water, extracted with dilute sulphuric acid, again thoroughly washed with distilled water, filtered, and the ether evaporated on the water bath.

After the beaker and contents had cooled, the residue from the ether solution was thoroughly extracted with petroleum ether. Upon evaporation of the petroleum ether, a rather viscid, slightly yellow residue was obtained. The distillate from this residue when warmed with alkali and distilled after acidification with sulphuric acid gave strong positive tests with Millon's reagent, bromine water, and the formaldehyde and sulphuric acid reagent. The precipitate was amorphous with the bromine water and did not give the pink color that is obtained with phenol. In other words, the indications are that it was a cresol rather than a phenol.

The residue in the flask still contained a large amount of undissolved material which was washed with concentrated sulphuric and nitric acids until a colorless solution was obtained and tested for phosphate with ammonium molybdate. A very positive test was obtained. From the manner of the extraction and the tests, it was assumed that the substance was tricresyl-phosphate. Quantitative analysis showed the substance to be present in a strength of about 3 per cent.

Having convinced ourselves of the identity of the adulterant chemically, experiments were made to substantiate our belief by pharmacological and pathological methods. Ten chickens and four dogs have been used.

Technical tricresyl-phosphate was secured and administered to young, full grown chickens and dogs. The dosage for chickens was 5 c.c. administered orally with a catheter. In about a week there were symptoms of unsteadiness in the use of the legs of the chickens, which became more pronounced in 24 hours; at this time another dose

was given. The 9th day from the initial dose, foot drop and difficulty in using legs were very marked in all chickens; 2 days later cyanosis of the comb and respiratory embarrassment were present, and about the 11th day, the chickens died. Since the behavior of the chickens and the symptoms which developed were identical with those which had received dosages of Jamaica ginger that had produced paralysis in human beings (see Figures I and II), we felt assured that the deleterious substance that had caused the epidemic of paralysis in humans was tricresyl-phosphate.

FIGURE I

Chicken 1. 5 c.c. Tricresyl-phosphate, 6/5/30—Repeated 6/13/30. Photographed 6/16/30—Died 6/16/30, P.M.

FIGURE II

Chicken 2. 15 c.c. Deco Ginger, 6/5/30; 10 c.c. Deco Ginger, 6/13/30, Photographed 6/16/30, Killed for Pathological Study 6/21/30.

Misfortune overtook the dogs before we had finished our studies. One was taken by some students by mistake and used in an experiment in another department. A second, which at the end of the 8th week had developed marked loss of use of hind legs and feet, also respiratory embarrassment including almost complete loss of voice, was likewise destroyed prematurely. The third escaped just after it had begun to show symptoms; and the fourth, though showing early signs of poisoning, has not advanced sufficiently at this time to warrant pathological examination. However, our experiments showed that while paralysis of dogs by the use of Jamaica ginger containing small percentages of tricresyl-phosphate was attained with great difficulty; nevertheless, they could be paralyzed by the drug alone, although the onset is slow. The dosage was 10 c.c., administered by mouth at 3-day intervals. Two doses were given to each animal.

Further to prove the question in point, it seemed advisable to try the effect of Jamaica ginger containing tricresyl-phosphate. For this purpose a sample of Jamaica ginger was secured which contained no cresyl or phosphate and was known to be of U. S. P. Standard. Four groups of two each of chickens were used. To one Jamaica ginger not containing tricresyl-phosphate was given; to the other three Jamaica

ginger containing various percentages of tricresyl-phosphate. The results are shown in Table I.

DISCUSSION OF TABLE

The results of these experiments are interesting for a number of reasons. The experiments showed: (1) Jamaica ginger not containing tricresyl-phosphate produced no paralysis or paralytic symptoms, and aside from the initial intoxication following the administration had no effect on the well-being of chickens; (2) Jamaica ginger containing as little as 1.5 per cent of tricresyl-phosphate would cause paralysis and even death of chickens; (3) in proportions greater than 3 per cent, death would occur in a few days—in our experiments, 14 days.

Another interesting point was the difference in the resistance of the different chickens to the ultimate effect so far as time was concerned. It will be noticed that chicken No. 6 received 1.5 per cent of tricresyl-phosphate and died in about 19 days, while chicken No. 8, which was

TABLE I

Chicken No.	6/2/30	6/24/30	6/30/30	7/3/30	7/9/30	7/10/30	7/12/30	7/14/30	Ultimate Fate
3	Gin. 1	Gin. 1	Well	Well	Well	Well	Well	Well	Dead 7/20*
4	Gin. 1	Gin. 1	Well	Well	Well	Well	Well	Well	Killed 8/15†
5	Gin. 2	Gin. 2	Leg weakness	Leg & foot weakness marked	Paralysis severe	Feet weakness	Feet useless, swelling of eyes	Condition same, respiratory trouble	Killed 8/15†
6	Gin. 2	Gin. 2	Leg weakness	Leg & foot weakness marked	Paralysis, respiratory trouble	Dead			
7	Gin. 3	Gin. 3	Leg weakness	Leg & foot weakness marked	Paralysis, respiratory trouble	Condition worse	Dead		
8	Gin. 3	Gin. 3	Leg weakness	Leg & foot weakness marked	Paralysis, respiratory trouble	Feet useless, respiratory trouble same	Condition same	Condition same	Dead 8/14
	6/21/30	6/24/30	6/27/30	6/30/30	7/5/30				
9	Gin. 4	Gin. 4	Leg weakness	Paralysis marked	Dead				
10	Gin. 4	Gin. 4	Leg weakness	Paralysis marked	Dead				

Different samples of ginger are marked: 1, no tricresyl-phosphate; 2, 1.5 per cent of tricresyl-phosphate; 3, about 3 per cent; and 4, about 4 per cent tricresyl-phosphate. The doses were 5 c.c. of each mixture with 15 c.c. of water administered by mouth.

* The cause of death of chicken No. 3 on July 20 was not determined. It was apparently all right at 5 P.M., July 19. It had not at any time shown any effect of the ginger, and at autopsy none of the pathology found in those showing the effects of ginger.

† Chickens Nos. 4 and 5—One well and one paralyzed. Since they had shown no change for over 3 weeks, it was decided that it was more valuable to make microscopic examinations of them than to keep them living for a longer period.

given 3 per cent, lived 53 days. The time of the appearance of initial symptoms was practically the same for all concentrations used, in this series being about 9 days. Another similarity was that, regardless of the duration of life following the onset of symptoms, all of the chickens developed respiratory difficulties; all died in coma; and all developed edema of the orbital region with watering of the eyes. The paralysis in all cases was very similar to that found in humans in "Jake" paralysis—toe drop, inability to use the feet, and while the legs could be moved they could not be used for ambulation. So far as we were able to discern the chickens' wings were not affected.

We were somewhat disappointed in the microscopic examination of the central nervous system, in that we did not find the fatty degeneration which was present in the human cases. We did, however, find karyolysis, karyorhexis, and degeneration of the nerve cells as shown by the difficulty or inability to stain them by any method. We may say that the typical pathological lesions so far as the central nervous system is concerned in cases of intoxication resulting from tricresyl-phosphate are karyolysis, karyorhexis, and degeneration of the cell bodies, the exact type depending on the animal affected.

A very interesting series of experiments on rabbits, dogs and calves, by Smith,[3] arriving at similar conclusions, differs from our work in that we were able to produce symptoms in dogs and were able to compare human and animal pathology.

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Sanitary Features of Irrigation*

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IN the desert more heed is given to water than is necessary in a country with a plentiful rainfall. It is the very basis of existence; with an ample supply the country prospers; without it the land remains barren. To supplement the shortcomings of nature in failing to provide a method to catch and retain the scant rainfall allotted to the Southwest, dams and reservoirs have been constructed to impound the surface runoff of storms so that the water may be conserved for use during dry seasons. The largest of these projects have been for irrigation and have had a direct effect upon the ground water levels of the irrigated valleys, building up a secondary underground storage of water.

The climatic condition normal to the arid Southwest may be somewhat better understood at this time when so much of the country has been suffering from drought. The normal annual precipitation for Arizona is 13.61",[1] varying from 3.10" at Yuma with an elevation of 150 ft. to 32.42" at Crown King with an elevation of 6,000 ft. The low humidity prevailing increases evaporation to such an extent that it is from 4 to 29 times the amount of rainfall. Such a condition makes "dry-farming" an impossibility.

When such a situation exists all water is valuable, regardless of its sanitary quality—the great concern is to utilize every drop. To do this the relatively pure impounded surface runoff is used for irrigation. This water percolates down through the soil, is pumped to the surface, and again irrigates crops. Raw sewage and the effluent from sewage treatment plants are also used for irrigation. The application of water to the land for growing crops is the same in each case; however, when sewage is employed more careful farm management is necessary, and the crops that can be grown are limited by custom and public health regulations.

The main canals of an irrigation system should be considered, for sanitary purposes, as streams with controlled flow. Taking the place

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of small rivers that flow through territory with more abundant rainfall, they are used by camps of agricultural workers for drinking water, washing clothes, swimming, watering live stock, and many other domestic purposes. The water in canals is usually of fairly good quality at the main diversion dam, but as it flows through the miles of cultivated area pollution increases until at the end of the system it has none of the clear, sparkling qualities so desirable in potable supplies. Samples taken at the head of one of the main canals of a large project had a count on agar at 37° C. of 150 bacteria per c.c. and *B. coli* group in one of five 10 c.c. portions. After flowing 16 miles, largely through farm land, there was an average count of 1,800 and 100 *B. coli* per c.c. At this point the entire flow of a river was diverted into the canal. The river water had an average total count of 2,000 per c.c. and 10 *B. coli* per c.c. Some 24 miles farther down the canal the average count was 2,600 and 1,000 *B. coli* per c.c. The dissolved oxygen of the canal water ranged from 6.90 to 11.55 p.p.m. and the 5-day oxygen demand from 0.2 to 6.35 p.p.m.

There was no evidence along the banks of the canal of any quantity of pollution entering the stream. Trash and refuse are sometimes thrown in the canal, the bodies of small animals are occasionally seen floating along, and the water which is clear at the diversion dam becomes muddy and contains floating grass and weeds.

Maintaining a canal system in a sanitary condition throughout its entire length would be a problem of magnitude. The canal mentioned above, one of the four main canals on the project, has a normal flow varying from 40 to 242 sec. ft.; after rains, when no water is needed for irrigation, the bed may be nearly dry. It is approximately 40 miles long, and there are many additional miles of laterals and ditches. Chlorine introduced at the canal heading would be dissipated long before the farm area was reached and would not take care of incidental pollution. Streams receiving sufficient raw or partially treated sewage to deplete the oxygen and materially increase the *B. coli* content should be purified to some extent before being used for general irrigation. It would be much simpler to treat and sterilize the sewage, though it is sometimes a problem to convince town councils of the wisdom of this policy.

It is difficult, if not impossible, to control the sanitation of the camps of unskilled laborers who are brought into an irrigated area. These workers, poor and ignorant, with no background of cleanly traditions, live in shacks under the trees along the canal banks. Their methods of waste disposal are primitive; if not carefully watched they will place privies on the inner bank of the canal, which also serves as

their water supply, bath tub, and laundry. Despite these conditions, remarkably few cases of water-borne diseases have been attributed to the use of canal water. In a few instances people swimming in the canals have contracted typhoid fever. In tracing the source of these infections we have on 2 occasions found a case among the Mexicans in a nearby camp. These patients were sent to a hospital and no further cases occurred in those districts. The flies that breed about these camps we feel are much more of a menace to health.

A few years ago a newspaper syndicated article blamed a typhoid outbreak in Chicago on lettuce grown in the irrigated districts of the Southwest. The health authorities claimed oysters were the causative agent, but unfortunately the accusation of the unscientific writer had much greater circulation than the health report, and it appeared that the lettuce growers would be heavily penalized unless this statement could be proved false.

We examined lettuce from 16 fields in different parts of the Salt River Valley and 2 in the Eloy district and found no evidence of *B. typhosus* or allied organisms. Many heads of lettuce were cultured and, while our technic was hastily devised, we felt if there had been any general contamination some indication of it would have been found.

In the irrigation districts with which I am familiar the *B. coli* in canal water originates from animal or agricultural sources. Human pollution is very slight, unless towns empty sewage into a stream that is later diverted for irrigation; even in this case dilution may furnish a factor of safety. A. L. Dopmeyer, Assistant Sanitary Engineer, U. S. Public Health Service, and the writer made a sanitary survey of an irrigation system alleged to be furnishing grossly polluted water. Our findings did not indicate any contamination sufficient to endanger the health of consumers of vegetables grown on land irrigated from these canals.

Mosquitoes may be a resultant evil of irrigation. In Arizona the topography and nature of the soil have largely prevented conditions favorable for their propagation. The main breeding places are in the weeds and grasses growing along the banks of drainage canals with low velocity or in water that is allowed to overflow the ditches and stand in ponds outside the fields. This latter is somewhat controlled by the Water Users' Associations that impose penalties for wasting water.

Irrigation as a means of land disposal of sewage has a most favorable field of operation in the Southwest. The scant annual rainfall, low relative humidity, and economic value of water present conditions for its success. With few streams having an average flow sufficient to

furnish dilution water, broad irrigation seems the logical method for final disposal of sewage. The management of a disposal farm is similar to that of any other sewage plant, and the results are directly dependent upon the ability of the employees.

There has been a tendency in recent years to disparage this method of disposal, but in the arid sections of the country its value is being more appreciated each year. California and the City of Los Angeles are studying land filtration and the recovery of water. It does seem futile in a country where water is so badly needed to waste the moisture content of sewage by allowing it to flow aimlessly down a dry arroya or into the ocean.

It is doubtful if irrigation with raw sewage will ever be an unqualified success; the nature of the solids and the amount of nondigestible cellulose tend to clog the soil and limit the type of crops that can be grown. Bar screens and preliminary sedimentation are necessary to give a sufficiently clear effluent for use without causing excessive odors or clogging the soil. More complete treatment serves to minimize these difficulties. With proper farm management the effluent from septic tanks can be used on crops without causing complaint.

Phoenix, Ariz., has a contract with a rancher to dispose of the 7,320,000 gal. per day effluent from the septic tanks. These tanks are old and overloaded; the effluent has a high oxygen demand, a pervasive hydrogen sulphide content, and large *B. coli* count; with all these faults it irrigates 300 acres of land on which are raised hay and grain sufficient to feed 1,000 head of stock a year. The rancher claims he can produce better crops and pasture nearly double the amount of stock that is possible on farms irrigated with canal water. The soil conditions are particularly favorable for disposal, being virgin river bottom land with a loose loam surface. At times it takes the entire flow for 26 hours to irrigate 10 acres.

This is the silver lining—the cloud also has a very dark side. The maximum water needed for irrigation is 980,000 gal. per acre per year, or for 300 acres 294 million gal., whereas the city delivers 2½ billion gal. of effluent to the farm. There is a large loss from evaporation, but the sun and climate have not prevented sufficient overflow to ruin the recreational features of the river for some miles below. The city is now having a more complete treatment plant designed so that the excess water can be sold to one of the irrigation districts.

The Tucson disposal farm, owned and operated by the city, has 355 acres under cultivation, with more being prepared for crops. Coarse bar screens and mechanical clarifiers treat the sewage before it is applied to land; the sludge is pumped to a four-compartment di-

gestion tank and when dried is used as fertilizer. The farm is operated by a skilled agriculturist who, by careful management, has been able to use a maximum of 7½ acre ft. without spoiling the crops by over-irrigation. This excessive quantity will be reduced as more land is cleared and levelled. About 2,400,000 gal. of clarified sewage are delivered to the ditch each day.

The maximum penetration noted after heavy application of sewage was 24 in. The farm lies along the Santa Cruz River; occasionally irrigation water reaches the dry channel through gopher holes or when it overflows from adjacent fields. A cased well 75 ft. deep near the heading of the ditch shows a consistently good quality of water.

The hydrogen sulphide in the effluent as it enters the ditch is from 1.5 to 2.0 p.p.m.; one-quarter of a mile farther on, at the corner of a highway, there is still sufficient gas to cause some complaints from motorists. As the district about the farm builds up it is felt that it will be necessary to give the sewage some further treatment so the effluent will be more stable when delivered.

Crops of corn, barley, milo maize, higuera, and cotton are grown; sheep are used to keep the Johnson grass out of the ditches; and experiments are now being made with hog feeding. The income from the farm pays all of the operating costs of the plant and most of the fixed charges. This year it may show a slight profit. Certainly this is a safer and saner method of disposing of plant effluent than allowing the partially treated liquid to flow down the dry channel of a river, relying on infrequent floods to carry away the deposited solids.

Any project whether irrigated with impounded surface runoff, drainage water pumped onto the land, or clarified sewage, offers many problems in sanitation. Waste disposal and mosquito control are much the same as in any rural districts, and there is the usual question of obtaining a satisfactory water supply for household purposes. When no suitable ground water is available at reasonable depths, the supply must be taken from the canals. Various types of home-made filters and sedimentation in jars are used to clarify the water, but no efficient simple means has been devised to purify it. True, it might be boiled for 20 minutes, but in a country with a mean maximum summer temperature of 100° F., cooling boiled water is no easy matter for a farm laborer's wife. The type of worker who lives along the canal banks is bewildered by even simple directions for sterilizing a bucket of water with some chlorine preparation.

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The Control of Thermophilic Bacteria in Pasteurizing Plants*

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THE control of thermophilic bacteria in pasteurizing plants is a problem receiving much attention. Lack of information on control under practical operating conditions led to a series of studies by the authors which were carried out in 1928 and 1929 in coöperation with the manufacturers of pasteurizing equipment, the departments of health, and the milk companies concerned.

The five market milk plants studied were large ones with pasteurizing runs of 5 to 7 hours, located at Buffalo and Syracuse, N. Y.; and Pittsburgh, Pa. Two of these used Burrell long flow holders, two Electropure flash, and one Creamery Package coil vat pasteurizers.

The general plan followed was first to take a series of samples at various stages during the pasteurizing run to gain a general idea of the situation. Counts were made by the direct microscopic method, and by the agar plate method, incubating the plates at 37° C. and 62.8° C. Comparison of plate counts at the two temperatures showed that many thermophiles failed to develop at 37° C. The direct microscopic method proved valuable in detecting an increase in thermophiles, as those encountered were large rod shaped spore-forming bacteria of types not commonly found in the raw supply. A few samples were examined with the methylene blue reductase test, using 62.8° C. as the incubation temperature and a layer of paraffin oil as a seal. This proved satisfactory and a microscopic examination of the milk after reduction revealed apparently pure cultures of rod shaped bacteria.

After a general idea of the situation had been obtained, an attempt was made to reduce the number of thermophiles by controlling the factors favoring their development.

Out of the mass of data secured in studies that occupied about five months, the results of certain instructive analyses are given.

* A preliminary summary of this paper is given in the *J. Bact.*, 19: 46–47, 1930. Other studies in the same series are published as *Bulletins* of the New York Agricultural Experiment Station, and may be secured on application to that Station.

TABLE I

THE RAPID DEVELOPMENT OF THERMOPHILES AT PLANT A, AS SHOWN BY THE INCREASE IN THE DIRECT MICROSCOPIC COUNT IN THE MILK LEAVING THE LONG FLOW HOLDERS—CARELESS OPERATING CONDITIONS

Date	Start to First Hour*	First to Second Hour*	Second to Third Hour	Third to Fourth Hour	Fourth to Fifth Hour	Fifth to Sixth Hour
			Holder 1			
Aug. 28, 1928	600,000	600,000	1,500,000	3,000,000	7,500,000	———
Aug. 29, 1928	<10,000	<10,000	3,000,000	4,500,000	9,000,000	———
Oct. 7, 1928	———	———	3,000,000	———	21,000,000	36,000,000
Oct. 10, 1928	———	———	———	3,600,000	15,000,000	12,000,000
Oct. 14, 1928	———	———	———	1,500,000	4,500,000	6,000,000
			Holder 2			
Aug. 28, 1928	<10,000	1,500,000	300,000	4,500,000	6,000,000	———
Aug. 29, 1928	600,000	1,500,000	6,000,000	7,500,000	———	30,000,000
Oct. 7, 1928	———	———	———	———	9,000,000	17,000,000
Oct. 10, 1928	———	———	———	3,000,000	4,500,000	8,400,000
Oct. 14, 1928	———	———	———	12,000,000	15,000,000	6,000,000

* The direct microscopic counts of individual bacteria for the first 2 hours cannot be considered accurate, because of the possibility of confusion with rod shaped bacteria of other types. Returned pasteurized milk was sometimes mixed with the raw supply, which explains the variations encountered at the start. Where spaces are blank, no samples were taken.

Examination of the raw supply at the five plants showed few thermophiles, usually less than 500 per c.c. as determined by an agar plate count at 62.8° C. Several exceptions were noted, indicating that unusual conditions may produce a high thermophile count in the raw supply. Return of unsterile moist cans to the producers proved to be one of these conditions. No method of completely eliminating thermophiles from the raw supply was found.

At one of the plants using long flow holders and at that using coil vat pasteurizers, the small number of thermophiles in the raw supply proved sufficient to inoculate the pasteurizing equipment so that, with careless operation, several millions of thermophiles per c.c. ordinarily appeared in the pasteurized milk toward the end of the run. In the two cities concerned, the situation was only partially appreciated by the officials in charge of milk inspection, as the number of colonies developing on standard agar plates from bottled milk picked up at random varied from less than 10,000 per c.c. to less than 100,000 per c.c. Many of the colonies obtained were of the pin-point type and the records of the two companies, as would naturally be expected from the fact that the samples examined were selected at random over a long period, were very irregular and inconsistent.

Table I shows the development of millions of thermophiles per c.c. during a 5- to 6-hour pasteurizing run at Plant A where two Burrell long flow holders were in use. The factors responsible for this rapid

development were found to be (1) presence of thermophiles in the raw supply, (2) prolonged holding of milk at pasteurization temperature, (3) repasteurization, (4) cooking of milk solids on to the walls of heaters, (5) presence of dead ends, and (6) the development of thermophiles within the holder. Each of these factors was studied individually.*

That faulty plant operations were of greater importance than the type of equipment and presence of thermophiles in the raw supply is shown in Table II, which gives the results of studies made at Plant B. Plant B used a Burrell long flow holder similar to that at Plant A, but none of the faulty operations found in Plant A were practised. This limited the development of thermophiles to two factors: (1) presence of thermophiles in the raw supply, and (2) development within the holder itself. Table II shows that only 60,000 to 600,000 thermophiles developed per c.c. in a 4-hour run, as disclosed by direct microscopic examination, in contrast to several millions per c.c. at Plant A during a run of the same length.

TABLE II

THE COMPARATIVELY SLOW DEVELOPMENT OF THERMOPHILES AT PLANT B, AS SHOWN BY THE DIRECT MICROSCOPIC COUNT ON MILK LEAVING A LONG FLOW HOLDER—CAREFUL OPERATING CONDITIONS

Date	Start to First Hour	First to Second Hour	Second to Third Hour	Third to Fourth Hour
Sept. 17, 1928	<10,000	<10,000	60,000	60,000
Sept. 19, 1928	<10,000	<10,000	<10,000	600,000

Repasteurization of milk returned from routes was practised at one plant using Burrell long flow holders and at one using Electropure pasteurizers. This was mixed with the raw supply previous to repasteurization. At the plant using the long flow holders, the discontinuance of repasteurization reduced the number of thermophiles but did not correct the trouble until other faulty operations were corrected.

Conditions were not favorable for the development of thermophiles with the Electropure process, on account of the high temperature employed (73° C.) and the installation and uniform operation of equipment. Table III gives the results of studies at two plants, C and D, using Electropure pasteurizers. These were operated in the same way except that repasteurization was practised at C but not at D. Table III shows that repasteurization was responsible for an increased development of thermophiles at Plant C, although the numbers were

* A detailed study is given in *Technical Bulletin No. 156* of the New York Agricultural Experiment Station, Geneva, N. Y.

not high as compared with those found in the other plants studied. Where no repasteurization was practised the increase was negligible. The small numbers of bacteria present made a direct microscopic count impossible and necessitated the use of agar plates incubated at 62.8° C.

Prolonged holding at temperatures above 37° C. was a factor in the development of thermophiles. At one of the plants using long flow holders, this was brought about by stopping the milk pump to wait for milk at the receiving platform, and by having a greater pasteurizing than bottling capacity which caused shut-downs. At the plant using the coil vats, there was poor management and some of the batches were held from 1½ to 2 hours at the pasteurizing temperature. Table IV shows that samples of this milk, taken from the same vat at intervals, gave a decreasing 37° C. plate count due to the destruction of the less heat resistant bacteria, and an increasing direct microscopic count due to the development of thermophiles. It shows in a striking way that special methods are necessary for the detection of thermophiles, as the 37° C. plate count alone would not have revealed their presence.

The rôle that filter cloths played in the development of thermophiles depended entirely on the temperature at which the milk was filtered and the length of time that the filters were in operation. Contamination from filter cloths was an important factor at the plant using the coil vats. This plant filtered the hot milk following pasteurization, the same filter cloth being used throughout the run of approximately 5 hours. Three or four stops of 10 to 20 minutes were ordi-

TABLE III

A STUDY OF THE DEVELOPMENT OF THERMOPHILES IN THE ELECTROPURE PASTEURIZER—SAMPLES TAKEN SIX TO SEVEN HOURS AFTER THE START OF THE PASTEURIZING RUN

Date	36 Hour Agar Plate Counts at 62.8° C.	
	Raw Milk	Pasteurized Milk
	Plant C, Repasteurization practised	
June 14, 1929	520	33,000
June 17, 1929	4,500	42,000
June 18, 1929	780	2,400
July 3, 1929	0	3,200
July 9, 1929	240	<100
	Plant D, No Repasteurization practised	
June 19, 1929	0	<100
June 21, 1929	1	140
June 27, 1929	30	70
July 8, 1929	1,500*	7,900

* The count of 1,500 on July 8, 1929, is higher than is normally found in raw milk. No explanation is available. The pasteurized milk shows a higher count on the same date than usual.

TABLE IV

DECREASE IN THE 37° C. PLATE COUNT AND INCREASE IN NUMBER OF THERMOPHILES IN THE SAME VAT OF MILK AS A RESULT OF PROLONGED HOLDING AT PASTEURIZATION TEMPERATURE

Date	Holding Time	37° C. Plate Count	Direct Count of Thermophiles
Aug. 19, 1929	20 minutes	70,000	30,000
	60 "	16,000	75,000
	90 "	7,000	900,000
	110 "	5,000	1,800,000

narily made, due principally to a greater pasteurizing than bottling capacity, but could have been reduced by better management. The filter was connected in such a way that it remained filled with hot milk during any period in which the machinery was stopped. Table V shows that these stops were instrumental in building up a thermophilic flora in the filter cloth so that contamination persisted after the milk that was allowed to stand in the filter during the idle period had been pumped out.

The findings were also confirmed by direct microscopic examination of milk and sediment scraped from the filter cloth at the end of the run, which showed enormous numbers of thermophilic bacteria. The increase was evidently due to development of thermophiles in the meshes of the filter cloth, resulting in an ever increasing contamination of the pasteurized milk. Replacing the cloths with fresh ones at 2-hour intervals, combined with draining the hot milk from the filter during stops, reduced the number but did not entirely eliminate them.

Filtration previous to pasteurization and at a lower temperature with changes of cloths at frequent intervals may be recommended as a means of controlling thermophiles. In fact, certain sanitary codes, like that of New York State, require that "pasteurized milk shall not be strained or filtered except through a metal strainer so arranged as to be sterilized with the bottling machine."

Examination of the coating of milk solids formed on the tubes of heaters and regenerative heater coolers revealed this at times to be a

TABLE V

THE CONTAMINATION OF PASTEURIZED MILK WITH THERMOPHILES FROM THE FILTER CLOTH WHERE PASTEURIZED MILK WAS FILTERED FOLLOWING A 30-MINUTE STOP

Date	Description	37° C. Plate Count	Direct Count of Thermophiles
Aug. 20, 1929	Pasteurized milk entering filter following a 30-minute stop after milk standing in the line had been pumped out	12,000	4,500,000
	Same milk leaving filter	59,000	9,000,000

veritable culture of thermophiles. It was here that the first noticeable increase in the number of thermophiles took place within the long flow holders and Electropure pasteurizers. The extent of the coating and the temperature were determining factors. The extent of the coating depended upon the kind of equipment and the method of operation. At one of the plants using long flow holders, the temperature of the circulating water in the internal tube heater was 10 to 15° higher than that of the milk. As a result, there was a large amount of milk solids cooked onto the tubes. Failure to keep the tubes bright and clean, faulty automatic temperature control and undersized heaters were factors responsible for an abnormal amount of cooking.

The development of thermophiles within the pasteurizer proved to be an important element. In the long flow holders, the inner walls of the milk tubes became seeded with thermophiles early in the run and the milk in passing through washed off ever increasing numbers. With the coil pasteurizers, a film of milk remained on the sides and bottom of the vats after emptying which contained a large number of thermophiles and served to inoculate each succeeding batch of milk. Last milk drained from vats always contained an increased number of thermophiles.

DISCUSSION

Control of the development of thermophiles in a pasteurizing plant must be varied with the type of equipment. With the positive hold type, it is possible to rinse the vats between runs while, with the long flow holder, this is not feasible unless a second complete set of equipment is provided for use during the washing period. With the Electropure equipment, growth in the heating chamber is not important because the temperature of 73° C. is too high to favor the development of thermophiles.

Variations in equipment and methods of operation caused each plant to present an individual control problem. Faulty plant operations proved to be more important factors in developing thermophiles than the type of equipment. At well operated plants, faulty conditions were brought under control regardless of the type of equipment.

SUMMARY

1. Studies on the development of thermophilic bacteria, at five large pasteurizing plants with runs of 5 to 6 hours' duration, are presented. Two of these plants used Burrell long flow holders, two Electropure flash and one Creamery Package coil vat pasteurizers.

2. An examination of the raw supply of these plants showed few thermophiles present—usually an agar plate count at 62.8° C. of less than 500 per c.c.

3. Data secured with careful and careless operation of Burrell long flow holders are presented which show that factors involving faulty plant operations, such as (1) prolonged holding of milk at pasteurization temperature, (2) repasteurization, and (3) cooking of milk solids on the walls of heaters, are the most important elements in the development of thermophiles.

4. Studies of Electropure pasteurizers at two large plants showed that conditions were not favorable for the development of thermophiles, chiefly because of the high temperatures employed and the uniform flow during operation. Where repasteurization of returned milk was practised, an increased number of thermophiles was found, although smaller than with any of the other types of equipment.

5. At the plant using the coil vats, prolonged holding at pasteurization temperature gave a decreasing 37° C. standard plate count and an increasing direct microscopic count of thermophiles.

6. Filter cloths were an important source of contamination where hot pasteurized milk was passed through a cloth used continuously for 5 hours, and where milk was allowed to stand hot in the filter during stops.

7. Each plant presented an individual control problem because of variations in equipment and methods of operation. Faulty plant operations proved to be more important factors in the development of thermophilic bacteria than the type of pasteurizing equipment.

NOTE: The author wishes to acknowledge his indebtedness to Dr. R. S. Breed of the New York Agricultural Experiment Station, under whose direction the work has been carried out and who has offered comments and criticisms on this paper.

Training

THE student takes something from a bottle, places it in a test tube, pours on it most any kind of acid and it turns a beautiful green. This experiment carries the label science; it is checked and the next one taken up with a certain superficial seriousness which covers over the knowledge on the part of the student that he is fooling, but getting a credit. This does not breed character. The magic word, Science, is, however, used, and something is done mechanically because the book said do it. No thought nor reason is expected or used. A certain number of carefully guarded Carnegie units are attached to it and the student goes ahead in a mechanical fashion for some more of these units so that he may enter a premedical course at college. He has been made to think of gain and not accomplishment, of advancement, rushed, forced advancement, and not of reason, judgment, poise, and beauty. The goal is becoming clearer. Two, three or more years of this and then medicine. There are those who can survive it, who can develop characteristics suitable for medicine in spite of it, and there are many who have not been subjected to a type of training which gives to them that which they did not have.—William DeB. MacNider, M.D., *South. M. J.*, Dec., 1929.

Sickness Records in School Hygiene

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THE adequacy of the school medical examination, even in its more highly developed form, as a means of keeping tab on the school child's health, is properly being called into question. The principal ground for skepticism is the obvious fact that the periodic health examination takes into account only a few conditions at intervals of 2 or 3 years; it cannot promptly bring to light any conditions as they arise in the interim. Furthermore, the health examination does not and cannot, unless it is made far more searching than it is now, bring to light other impairments and defects, and it cannot conform to a fundamental postulate for accurate diagnosis, namely, the opportunity for continuous observation.

It may as well be taken for granted that practical considerations preclude a method of continuous examination and observation of millions of children that a competent diagnostician would regard as satisfactory for an individual child. What the school health administrator wants is improvement in the prevailing procedure that will result in the prompter discovery and correction or treatment of important conditions that now are not brought to light at all or with too much delay. Evidences of this desire are to be seen in efforts to improve the medical examination itself and to supplement it with more frequent inspections by teachers and nurses, and by referring conditions thus discovered for special medical examination.

Another supplementary method, which has been discussed by Collins,[1] and in a limited degree proposed by the American Public Health Association's Committee on Record Forms,[2] and employed in an even more limited extent in a few localities, is a current record of absence from school on account of sickness. The possible uses of sickness records as a supplementary method of keeping in closer touch with the health of school children have been stated succinctly by Collins, as follows:

> The school sickness record would serve the double purpose of a continuous record of the health of the child and a criterion for referring children for special examination. Any child who suffers frequent attacks of illness which entail absence

from school may well be referred for examination, even though the condition is only headache, for it will enable the physician to discover in their early and preventable stages physical impairments which otherwise might be serious.

It is the purpose of this paper to report briefly the results of an experiment which had for its purpose the discovery by (1) medical examination, and (2) sickness records, of conditions that might need correction or treatment.

The experiment was conducted in the public schools of Olean, a city of about 23,000 inhabitants, in Cattaraugus County, N. Y., where for several years an experiment in rural health administration has been carried on with financial support and technical assistance from the Milbank Memorial Fund. In 1926 Edgar Sydenstricker, Director of the Division of Research of the Milbank Memorial Fund, suggested to Dr. C. A. Greenleaf, director of the Cattaraugus County School Health Service, that a record be made by the teachers as to the condition or disease causing all pupils' absences for which sickness was ordinarily given as the reason. The cause of illness was obtained from the written explanation of the child's absence signed by a parent or some responsible member of the family. In many cases the cause of absence was checked by the school nurse either by telephone or a visit to the child's home.*

The present report is based on the experience of two school years in one graded school. During these 2 years 475 pupils were enrolled, but only those who were in attendance 1 or 2 full school years were included in the record considered here.† For convenience in summarizing the results for 2 school years, a child attending (i.e., enrolled) for 2 years is counted as 2 (i.e., 2 "years of observation") and the statistics are stated in terms of 825 children enrolled for 1 school year; throughout this paper, therefore, the term "child" means a school child observed for 1 school year although the great majority of individuals were observed for 2 years. All of the children were in the age group 5–14 years, were fairly equally distributed as to sex,

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* It was found that conditions and diseases could be entered usually by means of a simple code in the regular school registers or roll books.

The code used was as follows:

c—cold	w—whooping cough	s—continued illness
m—measles	i—indigestion and headache	r—weather
d—diphtheria	f—scarlet fever	a—cause other than illness
t—tonsillitis	h—teeth	x—unknown
u—mumps	p—chicken pox	

Under "continued illness" was included surgical cases, fractures, tuberculosis, heart trouble, etc. The cause of "continued illness" usually was stated.

† A few pupils entering during the first month or leaving the last month of a school year were included.

and were nearly all white native born, and of native born parents.* The school was considered as representative of the various types of home environment such as are ordinarily found in a city of this size in the western part of New York.

Of these 475 pupils, 329 were given one "complete" physical examination; 103 were given two such examinations; about 230 were examined especially for nose and throat conditions by the school physician; and 3 tuberculosis contacts had special clinic examinations during the 2-year period. The results of an examination are related to the sickness record for the year in which the examination was made. About 30 children had no regular physical examination. All of the routine physical examinations were made by the school physician except for teeth, which were done by a dental hygienist, and for Snellen tests which were made by teachers and nurse. The examinations may be regarded as typical of the better grade of school physical examinations.

It was thus possible, for a large majority of the children, to utilize the records both of physical examinations and of sickness.† The morbidity experience and the findings of the physical examinations in the 2 school years are summarized in Tables I and II.

In general, the relative importance of the principal causes of sickness is similar to that reported by Collins[3] and by Sydenstricker[4] for children of similar ages, and thus may be considered fairly typical. The interesting and, from the point of view of this discussion, extremely significant indication afforded by this record is the fact that children were absent from school on the average nearly 4 times a school year for a total of nearly 8 school days for causes which, with few exceptions, obviously are not taken into account at all, or at least not directly by the physical examination. In mitigation of this apparent condition it may be said that the great majority of these causes are merely temporary ailments—such as "colds" and "upset stomachs"; yet it cannot be denied that as much responsibility rests upon school health authorities to see that actual cases of measles, whooping cough, tonsillitis, earache, toothache, and the like are followed up to

* The age distributions for both and either sex were as follows:

	5	6	7	8	9	10	11	12	13	14	Total
Both sexes	84	77	72	96	97	114	103	97	50	35	825
Boys	50	41	44	39	51	62	48	38	24	14	411
Girls	34	36	28	57	46	52	55	59	26	21	414

† For this purpose the various records for each child during the 2 school years 1926–1927 and 1927–1928 were transcribed on to a single sheet which eventually contained the record of previous communicable disease incidence, immunizations, scholastic failures, record of sickness, and the results of whatever physical examinations were made during the period. The records of children who were transferred from and to other schools were completed, and the children who stopped school were followed up to ascertain the cause of discontinuance.

TABLE I

MORBIDITY AMONG CHILDREN 5–14 YEARS OF AGE BY CAUSE IN AN OLEAN, N. Y., SCHOOL, SEPTEMBER, 1926–JUNE, 1928

Cause of Illness	Number of Cases of Illness	Number of School Days Lost	Cases per 100 Children per School Year of 184 School Days	School Days Lost per 100 Children per School Year of 184 School Days
All causes	3,054	6,357.5	373.3	777.2
Measles	130	755.5	15.9	92.4
Whooping cough	22	538.5	2.7	65.8
Chicken pox	13	95.0	1.7	11.6
Scarlet fever	4	85.0	.5	10.4
Diphtheria	1	15.0	—	—
Colds*	1,468	2,404.0	179.5	293.9
Tonsillitis and sore throat	121	210.5	14.8	25.7
Pneumonia	1	41.0	—	—
Digestive diseases†	778	798.0	95.1	97.6
Toothache and diseases of teeth	268	245.5	32.8	30.0
Earache and ear diseases	9	28.0	1.1	3.4
Accidents	8	50.0	1.0	6.1
Tonsil operation	3	51.0	.4	6.2
Unknown diagnosis	214	692.0	26.2	84.6
Tuberculosis	2	107.5	.2	13.1
Other diseases and disorders‡	12	241.0	1.5	29.5

* Includes all respiratory diseases except pneumonia and tonsillitis and sore throat.

† Includes headaches.

‡ Includes rheumatic fever, appendicitis operation, sore eyes, boils, nervous prostration, heart, undefined abscess and illness from scarlet fever inoculation.

the same extent as ear, eye, or tooth defects found upon relatively infrequent examinations. In fact, the question properly may be raised as to whether or not a child who is subject to frequent respiratory or digestive disorders, even though they may be mild, should be regarded with as much concern as if he or she had a "3x" defect of some sort.* Table III shows the frequency of absences per school year on account of "colds" and "indigestion and headache."

Clearly, a record of sickness reveals cases that constitute legitimate problems for the school health service. Certain of these are not shown at all or, at best, indirectly by the routine physical examination; such as cases of whooping cough, measles, and other infectious diseases, frequent colds, headaches, and digestive disorders. On the other hand, it is equally clear that certain defects and impairments may not be revealed at all by a sickness record for the simple reason that they

* Another method would be to consider cases of a given length of absence for such causes as "colds," as needing follow-up, but the frequency of their occurrence would seem a satisfactory criterion.

TABLE II

PREVALENCE OF SPECIFIC DEFECTS AMONG 535 CHILDREN 5–14 YEARS OF AGE IN AN OLEAN, N. Y., SCHOOL, SEPTEMBER, 1926–JUNE, 1928

Defect of	Condition Specified					Per Cent				
	Normal	1x	2x	3x	Defect Corrected	Normal	1x	2x	3x	Defect Corrected
Tonsils	264	66	77	29	99	49.3	12.3	14.4	5.4	18.5
Nose (obstruction)	533	0	0	2	0	99.6	0	0	.3	0
Glands	401	133	1	0		75.0	24.9	.2	0	
Thyroid	440	89	5	1		82.2	16.6	.9	.2	
Nervous system	527	2	3	3		98.5	.3	.6	.6	
Heart	515	17	1	2		96.3	3.2	.2	.3	
Lungs	532	2	0	1		99.4	.3	0	.2	
Ears	529	4	0	2		98.9	.7	0	.3	
Eyes	461	17	15	25	17	86.2	3.2	2.8	4.7	3.2
Teeth, temporary	249	235	49	2		46.5	43.9	9.2	.3	
Teeth, permanent	400	15	98	22		74.8	2.8	18.3	4.1	
Orthopedic	532	0	0	3		99.4	0	0	.6	
Speech	528	0	4	3		98.7	0	.7	.6	
Skin	532	1	0	2		99.5	.2	0	.3	
Anemia	534	1	0	0		99.8	.2	0	0	

TABLE III

DISTRIBUTION OF 793 CHILDREN (SCHOOL YEARS OF OBSERVATION) ACCORDING TO THE FREQUENCY OF RESPIRATORY AND DIGESTIVE ATTACKS AND HEADACHES IN AN OLEAN, N. Y., SCHOOL, 1926–1928

Number of Attacks in a School Year	Colds and Other Respiratory Attacks Except Tonsillitis, Sore Throat and Pneumonia		"Indigestion and Headaches"*	
	Number	Per Cent	Number	Per Cent
0	223	28.1	408	51.5
1	202	25.5	185	23.3
2	147	18.5	82	10.4
3	88	11.1	54	6.8
4	58	7.3	26	3.3
5	26	3.3	17	2.1
6	23	2.9	8	1.0
7	7	.9	8	1.0
8	7	.9	4	.5
9	4	.5	0	—
10+	8	1.0	1	—
4+	133	16.8	64	8.1
8+	19	2.4	5	.6

* It is realized, of course, that a more specific record as to digestive attacks, and as to headaches, would be desirable.

do not manifest themselves in actual sickness although they may eventually cause ill health. The two methods are complementary, even for those conditions which are included in both.

If the fairly common assumption were true, that a medical examination, as a method of revealing hidden defects and impairments, is an adequate means of appraising the health of the individual, one should expect a fairly consistent and high correlation between the existence of defects or impairments and the incidence of actual sickness during a period of 2 years in a group of school children. This was not found to be the case in the experience recorded. In order to ascertain how far the assumption was justified, the children in this school were divided into two categories: (1) those found upon physical examination to be normal or to have a slight abnormality (1x), and (2) those having any defective condition serious enough to warrant notification of the parents that the condition needs attention (2x and 3x), and the general illness rates for these two classes were computed. Table IV and Figure I give the comparison by age groups. The illness rate varies according to age, as may be expected, but evidence that it is higher among children with gross defects than among those who are free from them is by no means definite. It may be argued that this lack of association is due to inadequate examinations; possibly this is in a measure true, but our observation was that the physical examinations in this school, which were made by the director of the school health service, were done with more care than is ordinarily found in routine work of this kind.

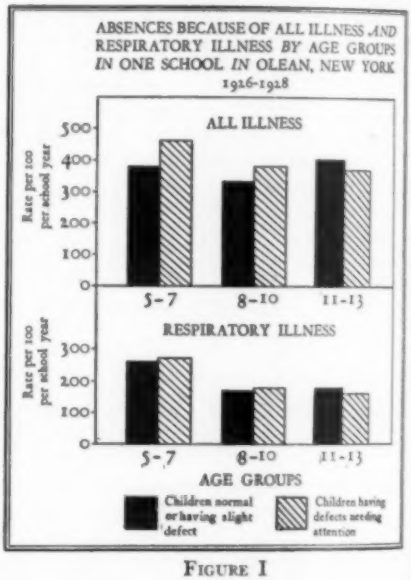

FIGURE I

This comparison may be carried a step further by comparing the prevalence of *specific* defects among 221 children suffering less than the average number of sicknesses and among 176 children who were sick frequently (5 attacks or more per year) as is done in Table V.

Now the striking fact shown by this comparison is not that the defect rates were generally somewhat higher in the "sickly" group, but that relatively a small proportion of 176 children who were actually sick 5 or more times during a school year were discovered to have *any*

TABLE IV

SICKNESS RATE AMONG OLEAN, N. Y., CHILDREN WITH AND WITHOUT SOME DEFECT (2X OR 3X) NEEDING ATTENTION, 1926–1928*

Age	Rate per 100 Children per School Year of 184 Days				School Years of Observation	
	All Sickness		Sickness from Colds			
	Normal or "1x" Defect	"2x" or "3x" Defect	Normal or "1x" Defect	"2x" or "3x" Defect	Normal or "1x" Defect	"2x" or "3x" Defect
5–7	384	465	265	273	141	74
8–10	333	383	157	185	111	183
11–13	400	374	177	161	81	158

* This tabulation includes the sickness record for both school years of all children who had a complete physical examination at some time during the 2 school years.

serious defects upon physical examination. In other words, the findings of the physical examination, even when considered from the point of view of specific and serious conditions, are a poor indication of the extent to which the child is actually sick.

Again, we may consider certain defects which may be reflected directly in sickness of the same specific nature, such as diseased tonsils and tonsillitis, and carious teeth and toothache. By including chil-

TABLE V

PREVALENCE OF SERIOUS DEFECTS AMONG CHILDREN SICK LESS THAN THE AVERAGE AND AMONG CHILDREN FREQUENTLY SICK IN AN OLEAN, N. Y., SCHOOL, 1926–1928

Defects	Per Cent having "2x or 3x" Defects	
	221 Children having Less than 3 Sicknesses per School Year	176 Children having 5 or More Sicknesses per School Year
Tonsils	15.9	23.3
Nose (obstruction)	0	1.1
Glands	0	.6
Nervous system	1.8	1.2
Heart	1.4	.6
Lungs	0	.6
Ears	0	.6
Eyes	7.2	10.8
Temporary teeth	8.6	10.8
Permanent teeth	19.9	27.3
Orthopedic	.9	.6
Speech	.5	2.8
Skin	0	0
Anemia	0	0
Thyroid	.5	2.3

dren who had special nose and throat examinations in addition to the regular physical examination, we had a total of 767 children observed for 1 year. Relating the sickness record to the same school year in which the examination was made, the children were classified into two groups: those with "normal" or "1x" tonsils and those with "2x" or "3x" tonsils. In the latter group there were 163 children, all of whom presumably were referred for correction. But of the remaining 604 children with "normal" or "1x" tonsils, 59 actually suffered one or more attacks of tonsillitis or sore throat. Six of them had attacks in each of the 2 school years. A considerable number of these, if not all, properly should be considered as needing examination and probably attention. Similarly, 177 children were found upon examination to have teeth needing attention, but of the 413 children whose teeth were in satisfactory condition when the examination was made, 73 actually suffered one or more toothaches that resulted in absence from school.

Summarizing the results of the experiment, it appears true that the proposal of the American Public Health Association Committee on Record Forms to utilize sickness records as a means of discovering conditions in school children that may need treatment or correction, is a sound one in principle. A current record of sickness undoubtedly reveals many conditions which the medical examination does not bring to light. Obviously, if the sickness record is made specific enough as to cause, along the lines suggested by Collins, the information thus gained is more effective than merely a record of the number of days lost on account of illness without reference to more than a few general causes. How practicable will be the actual reference of children to physicians and clinics as the result of recording and reporting illnesses of specific kinds, is a question which must be determined by further experimentation. It is planned to make such an experiment in the near future and, if possible, to measure its results in the terms of treatments, corrections and improvement in health of the children as compared with results obtained in schools where ordinary medical examinations and school inspection alone are in operation.

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NOTE: Acknowledgments are made to Dr. C. A. Greenleaf, Director of School Hygiene, Cattaraugus County, whose interest and coöperation have made available the records used in this study, and to Mae P. Duffy, of the Cattaraugus County Health Department, who assembled the records.

A Peep into West Indian Medical History

J. A. OGILVIE

Porus, Jamaica, B. W. I.

NOW that American citizens are taking a keener interest than ever before in the West Indies, both from the standpoints of health and commerce, a peep into the sad records and deplorable conditions of past and bygone days will, I am sure, convince readers how completely modern sanitary science has changed the medical history of these charming and picturesque islands.

Up to quite recent times, the white Northerner upon visiting the West Indies was in danger of being attacked by remittent or intermittent fever, dysentery, or yellow fever, and frequently did not survive his arrival by more than a few weeks, while the mortality among the white troops was simply staggering.

Formerly five years were sufficient for the disappearance of a white regiment of 1,000 men, and sometimes in a single year a regiment would lose 300 men.

The sanitary conditions were awful; pools of stagnant water were everywhere; and refuse matter, exposed to heat and air, accumulated and decayed in the yards, streets and barracks; in short, sanitary arrangements of any kind were nonexistent, public health duties being entirely relegated to the John Crows (vultures), and these repulsive birds, harbingers of death, could daily be seen by the scores, actively and energetically engaged in dismembering the putrefying bodies of dead animals, unmolested and undisturbed by passers-by.

Is it any wonder that less than a hundred years ago service in the West Indies was looked upon as almost certain death? Yellow fever was the chief destroying angel, with intemperance as the principal contributory cause, for many of the European soldiers took to drink at the wretched life and hopeless outlook, and deaths from delirium tremens were frequent. The salt meat they were obliged to eat caused a raging thirst which the rum bottle only aggravated. The sad story is summed up by one medical writer in the following words: "Our troops in the West Indies are killed by drinking new raw rum; and so are the lower order of mechanics and white people on the plantations."

In Jamaica in the years 1817 to 1836, the mean mortality was 121.3; the mean of the 4 healthiest years gave 67, and of the 4 unhealthiest years, 259 per 1,000 of strength. Between 1837 and 1855, the mortality had declined one-half. In 1864, the mortality was much below the home standard. In 1867, it ran up nearly to the old number from the prevalence of yellow fever, which appeared again at Newcastle and caused a greater loss than it had done in 1860. (No epidemic of yellow fever has occurred in Jamaica since 1897.)

In Trinidad and Barbados, the mortality was somewhat lower than in Jamaica, but the graves of whole battalions are still to be seen in their cemeteries, and bear silent testimony to the horrors of the past.

Toussaint L'Ouverture was doubtless an exceptional man, and rightly made use of circumstances to achieve his ends, but if history is true, Hayti owes her independence more to the malignant form of yellow fever which decimated the French and English armies than to any military genius which he exhibited. The white troops sent to Hayti from Jamaica between 1795 and 1798 were troops condemned to death, it being related that one whole regiment from colonel to drummer boy was exterminated by yellow fever, not a single man surviving. An entire French army under General LeClerc was in its turn almost annihilated by this dread malady in 1802 and 1803.

Today the mortality of the West Indies compares favorably with that of most American cities, and the white man from northern latitudes, be he American, Canadian, or European, enjoys as good health in the perpetual summer of these sunny islands as he does under his own temperate skies, provided he cultivates regular habits and avoids intemperance.

This transformation has been brought about by a more accurate knowledge of the causes of disease, and still more gratifying results will follow when the technical means of prevention are more efficiently applied.

The change which has taken place during the 20th century in the health conditions of these sun-kissed isles of the West vividly emphasizes the truth of the Latin maxim *Homini nihil utilius homine*, for this remarkable achievement has only been rendered possible by the self-sacrifice, devotion and martyrdom of members of the medical profession who concentrated their efforts on research and experimental work to the end that the human family might enjoy freedom from pestilence and disease.

A Bacteriological Study of Grade A Pasteurized Milk

CECIL BROOKS

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THE Second Corps Area Laboratory, as does every other Corps Area or Department Laboratory of the U. S. Army, examines samples of milk sent to it through the mail by medical officers of some large and many small stations within its Area. The Second Corps Area Laboratory is situated at 39 Whitehall Street, New York, N. Y. It serves the First as well as the Second Corps Area; hence the region from which it receives samples takes in all of New England, New York, New Jersey and Delaware. It is evident that bacteriological examination of milk in the Second Corps Area Laboratory must perforce be done by the direct microscopic method. The method of preparing samples for shipment to the laboratory is set forth in Army Regulations 40–310, Section XII, pars. 31 and 32, which are quoted verbatim.

Section XII

SPECIMENS OF MILK

	Paragraph
General provisions	31
Preparation of milk for shipment	32

31. General provisions—The information to be gained by the examination of specimens of milk shipped to laboratories is so limited that such examinations will always be conducted locally wherever laboratory facilities are available. For specimens forwarded by mail, resort must be had to the direct-count method of determining the bacteria present rather than to the colony count. The direct-count method indicates the actual number of bacteria present and bears no relationship to the actual number of living organisms present at the time the specimen is collected. This is especially true in the case of milk that has been pasteurized. The direct-count method, therefore, is an index of past pollution rather than of the number of living organisms present, and its correct interpretation is based largely on a knowledge of the character of the milk at time of collection, whether raw or pasteurized, and on the sanitary condition of the dairy from which it came. All dairymen supplying stations or commands will be required to furnish the surgeon of the command a quart bottle of milk, on request, at least once each month for examination. The specimen to be analyzed will be selected at random from the delivery wagon. If the specimen is not to be examined locally, the bottle will immediately

be placed on ice pending its preparation for shipment. The specimen will be shipped on the day of collection.

32. Preparation of milk for shipment—A special container, capacity 120 c.c., in mailing case, is supplied for shipment of milk specimens. The following procedure will be carried out in preparing the specimens for shipment: The quart of milk will be poured 25 times between sterile containers in order that the milk and cream may be thoroughly mixed and that clumps of bacteria may be broken up. After thorough mixing, add 1 c.c. of commercial formalin to the quart of milk and agitate thoroughly to insure inhibition of further growth of bacteria. Then fill the sterile container. It is essential that the bottle containing the specimen be filled flush to the lower end of the stopper to prevent churning of the specimen with formation of butter while in transit. Secure the stopper by binding the muslin cover in place with the copper wire. Test for leakage. Label and prepare forms as directed in paragraph 4 and note on the label the name of the dairy and the word "formalinized." Pack securely in the mailing case with absorbent cotton.

Apparently no adequate standards of direct microscopic counts of pasteurized milk exist. In fact, the application of the direct microscopic method of counting bacteria to pasteurized milk is not commonly advised. Certainly the counts arrived at by direct microscopy of pasteurized milk represent not the number of living bacteria but the number of bacteria both living and dead. To quote *Standard Methods of Milk Analysis*, A. P. H. A., 5th Ed., p. 26:

> Where there is reason to expect the presence of dead as well as living organisms, as for example in pasteurized milk, it is improper to regard microscopic counts as counts of living bacteria. Valuable information may, however, be obtained by making comparative plate and microscopic counts from samples of pasteurized milk.

With this in mind and with a view of establishing standards for our own use which would enable us to interpret our routine counts, a study was made of the pasteurized Grade A milk of two of the largest distributors in New York City. Quart bottles of milk were taken from the regular morning deliveries, 10 deliveries being made over a period of 4 weeks.

Examination of the milk was begun about 2 hours after delivery. Each quart was divided into 5 parts. The first part, about 160 c.c., was examined immediately, as received. Four lots of 200 c.c. each were preserved with formalin at that time and were examined on the following day.

Examinations made of milk untreated with formalin were: methylene blue reduction test; direct-count of bacteria and leucocytes; stroke cultures of 1 : 100 dilution on the surface of blood agar plates; and standard agar pour plates, using two dilutions, 1 : 100 and 1 : 10,000. With two exceptions, the examinations were the same for the formalinized specimens. Agar pour plate cultures of the

1 : 10,000 dilution were omitted in the case of the formalinized specimens, as were also the blood plate cultures.

Because of the routine use of formalin for preserving specimens of milk received for examination by the Second Corps Area Laboratory, the influence of formalin upon the reductase tests and microscopic counts of bacteria and leucocytes in this study were of considerable interest. Four quantities of formalin were used in order to find the quantity which would least interfere in these examinations and still inhibit the growth of bacteria in the milk. The four quantities of formalin used were 0.2, 0.5, 1.0 and 2.0 c.c., each in 200 c.c. of milk, thus giving percentage solutions of 0.1, 0.25, 0.5 and 1.0, respectively.

Formalinized milk was held at room temperature for about 24 hours before examination. This insured the milk practically the same treatment as if it had been shipped from a distant station.

METHYLENE BLUE REDUCTION TESTS

All methylene blue reduction tests were made in duplicate, using 10 c.c. quantities of milk. The reduction time recorded is the average for the two tests. The difference in time required for reduction in the two tests was never appreciable. The time required for reduction in all the tests is shown in Table I.

TABLE I

REDUCTION TIME FOR ALL TESTS

Specimen	Dairy	1	2	3	4	5	6	7	8	9	10
Unformalinized	No. 1	0	X	X	X	X	X	X	X	X	X
	No. 2	0	X	X	X	X	X	X	X	X	X
0.1% formalin	No. 1	4	X	X	4½	2	1½	3	2	4	X
	No. 2	3½	3	5	3	1½	4	4½	2	4	2½
0.25% formalin	No. 1	2½	0	X	X	2	2	X	X	0	X
	No. 2	X	X	X	3½	0	X	X	X	0	X
0.5% formalin	No. 1	0	0	0	0	0	X	0	0		
	No. 2	0	0	0	0	0	0	0	0		
1.0% formalin	No. 1	0	0	0	0	0	0	0	0		
	No. 2	0	0	0	0	0	0	0	0		

0—not reduced overnight Figures—reduction in hours X—reduction overnight

Soon after beginning this study, it was evident that the larger quantities of formalin used, 0.5 and 1 per cent, were sufficient to prevent reduction of methylene blue. Accordingly, after the 8th delivery of milk, examinations of specimens containing those quantities of formalin were discontinued.

The smaller quantities of formalin affected reduction in the opposite manner from the larger amounts. Reduction was hastened. The reduction time of the 0.25 per cent formalin-treated milk more

nearly agreed with that of the untreated milk than did the reduction time of any of the other specimens.

The figures available are too meager to do more than indicate that the optimum amount of formalin to use lies somewhere around 0.25 per cent. No ratio between reduction time of formalinized and unformalinized milk may be established. It is certain that the reductase test is of no value with pasteurized milk containing as much as 0.5 per cent formalin and it is of doubtful value when the milk contains as little as 0.1 per cent formalin. When reduction with milk containing 0.25 per cent formalin is not complete within 5½ hours, the milk probably contains few bacteria, but reduction in a short time does not necessarily denote a large number of bacteria. The significance of the reductase test is not indicated by this study.

CULTURES

Blood plate cultures of 1 : 100 dilutions of unformalinized milk were made by surface stroking. Hemolytic streptococci never were found in these cultures.

Standard agar pour plate cultures of 1 : 100 and 1 : 10,000 dilutions of unformalinized milk and 1 : 100 dilution of each specimen of formalinized milk were made. The average standard plate counts in unformalinized milk were: No. 1, 5,800; No. 2, 9,800. This gives a general average count of 7,900, which is well within the limit of 30,000 allowed by the *New York State Sanitary Code*. The figures from which this general average count is derived are given in Table II.

TABLE II

ESTIMATED BACTERIAL COUNTS PER C.C. OF MILK BASED ON COLONY COUNTS

Examination	No. 1	No. 2	
1	1,400	12,000	
2	300	9,700	
3	12,000	2,800	
4	1,500	3,000	
5	6,500	8,900	
6	(Excluded)*	17,000	
7	800	9,600	
8	11,000	13,000	
9	17,000	7,700	51,900
10	1,400	14,000	97,100
Totals	9) 51,900	10) 97,100	19) 149,000
Averages	5,766	9,710	7,842
	or 5,800	or 9,800	or 7,900

* An unusual specimen. The milk contained 50,000 large, coarse bacilli per c.c. This was interpreted as either pasteurizer or bottle contamination.

In the cultures of formalinized milk, the smallest quantity of formalin proved sufficient to inhibit growth. None of the cultures contained more than three colonies.

MICROSCOPIC EXAMINATIONS

The microscopic examinations were quite complete. Both leucocytes and bacteria were counted. Mononuclear and polynuclear leucocytes were counted separately, as were the coccoid and bacillary forms of bacteria. The cocci and bacilli were counted both as individuals and as clumps or chains.

The technic employed was a slight modification of the Breed Method as described in *Standard Methods of Milk Analysis,* 5th Ed. The spreads were stained with Wright's stain instead of methylene blue. All counts were made as accurately as possible. With the exception of 3 counts in which 40 fields were used, counts were based on examination of 20 fields. Two spreads were made for each count, 10 or 20 fields being examined on each spread.

While the majority were fairly uniform and near the average, some of the microscopic counts varied greatly from the average. Averages of all microscopic counts are shown in Table III.

TABLE III

AVERAGES OF ALL MIRCOSCOPIC COUNTS

Nature of Specimens	Individual Bacteria	Groups of Bacteria	Leucocytes
Unformalinized	1,700,000	480,000	1,400,000
0.1% formalin	1,400,000	420,000	1,200,000
0.25% formalin	1,500,000	480,000	1,100,000
0.5% formalin	1,500,000	370,000	1,000,000
1% formalin	1,500,000	420,000	840,000
General average	1,520,000	434,000	1,108,000

It may be seen in Table III that formalin makes no considerable difference in the count of bacteria, but very definitely affects the leucocyte counts, the larger amounts of formalin lowering the leucocyte counts.

DISCUSSION

In all, 87 specimens are considered in this study. Each of the 20 quarts of milk was divided into 5 parts, 4 of which parts were formalinized. Eight specimens were not examined. One quart (five specimens) of milk was arbitrarily excluded from consideration because of its unusual nature. This milk contained about three times as many bacteria in culture and more than twelve times as many microscopically as any other milk from either of the dairies. It is

thought that the bacteria, principally bacilli, may have been due to pasteurizer contamination; another suggestion is bottle contamination. This milk was pasteurized in Orange Co., N. Y. All the other milk was pasteurized in New York City.

The data presented show that Grade A pasteurized milk may contain millions of dead bacteria per c.c. Milk with an average plate count of 7,900 has been found to contain an average of 434,000 (roughly 440,000) groups of bacteria per c.c., about 1 to 55. Using the same ratio with a plate count of 30,000, which is allowed by the *New York State Sanitary Code*, it is found that an average of 1,650,000 groups of bacteria per c.c. may be present.

It cannot, of course, be claimed that 1,650,000 groups of bacteria per c.c. is the maximum number to be allowed for Grade A pasteurized milk. It is probably fair and reasonable to adopt the rule, at least tentatively, that pasteurized milk should not be classed below Grade A unless it contains more than 2,000,000 groups of bacteria per c.c.

In comparing direct-counts of pasteurized milk with plate counts, a high ratio must be used; certainly nothing like the ratio of 4 to 1 used for raw milk may be considered. The ratio evolved through this study, 55 to 1, has held fairly well in most of the examinations made.

An average of three and one-half times as many individual bacteria as groups of bacteria has been found in direct-counts. There seems to be no good reason to continue to count individual bacteria in future routine examinations. Groups are much easier to count and the counts of clumps and chains mean just as much as the laboriously made counts of individual organisms, at least in pasteurized milk.

Little has been gained by making separate counts of coccoid and bacillary forms of bacteria or of polynuclear and mononuclear leucocytes. No relation between the number of cocci or bacilli and the number of leucocytes was found. Three polynuclear to two mononuclear leucocytes were found quite regularly, but the cocci and bacilli were distributed very irregularly.

SUMMARY

Grade A pasteurized milk, part of which was formalinized, was used for reductase tests, direct-counts of bacteria and leucocytes, blood agar plate cultures and standard agar plate cultures in an attempt to establish standards to use in interpreting results of routine bacteriological examinations of formalinized, pasteurized milk at the Second Corps Area Laboratory. Eighty-seven specimens were used in this study.

Each sample of milk was examined as delivered and again after preservation with 0.1, 0.25, 0.5 and 1.0 per cent formalin. Even in the smallest amount, the formalin stopped growth of bacteria. It did not change counts of bacteria in the

microscopic examinations, but it did lower the leucocyte counts. The two larger amounts of formalin prevented reduction of methylene blue, while the smallest amount hastened reduction. A percentage of 0.25 formalin appeared to better advantage than the other quantities. The significance of the reductase test has not been shown.

The average standard plate count was 7,900.

Surprisingly high direct-counts were obtained. Roughly, averages were: 1,500,000 individual bacteria; 440,000 groups of bacteria; 1,000,000 leucocytes.

The ratio between standard plate counts and microscopic counts of groups of bacteria in Grade A pasteurized milk was found to be 1 to 55.

Pasteurized milk should not be classed below Grade A unless it contains more than 2,000,000 groups of bacteria per c.c.

Three and one-half times as many individual bacteria as groups of bacteria were found in direct-counts.

Counts of individual bacteria, counts of cocci and bacilli separately and counts of mononuclear and polynuclear leucocytes separately were not worth the effort required.

CONCLUSIONS

1. In pasteurized milk, a ratio of 55 to 1 may be used to compare direct-counts of bacteria with standard plate counts.

2. Grade A pasteurized milk may contain fully 2,000,000 groups of bacteria per c.c. in direct microscopic counts.

NOTE: The author desires to express his thanks to Major Joseph W. Smith, Jr., Medical Corps, U. S. A., for his criticism and assistance.

The Public Health Service as a Career

THE salaries . . . are not munificent, and the chief reward of public health service is to be sought in the work itself. There is a great fascination for many people in scientific enquiry and investigation in which the practice of preventive medicine provides unlimited scope. To watch the effect of one's procedure upon the progressive health of a community provides one with a solid satisfaction equal to any that can be found in other branches of practice. More fields remain to conquer, so that there is ample scope for the exercise of unlimited genius yet. Preventive medicine has long come into its own, although forty years ago and less it was the Cinderella of the profession. Public health means more and more every year to the man in the street who, while he may speak with reverential awe of the wondrous operations of some great surgeon, appreciates far more highly the measures which render such an operation unnecessary or prevent the occurrence of a disease, and there is no doubt whatever that the public health service is making good its promises, and will undergo considerable expansion yet.—Harold Kerr, M.D., *Med. Off.*, Sept. 6, 1930, p. 97.

Incubation of the Completed Kahn Test

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IN the standard Kahn test[1] the reactions are read immediately after the patient's serum and antigen are brought into intimate contact during the 3-minute shaking period. Incubation periods which are part of the complement fixation and certain precipitation procedures are not required to bring about visible flocculation in the Kahn test. Because incubation periods were part of Kahn's original procedure (1922) and of tests based on the hemolytic systems, many workers erroneously make this step a part of the standard Kahn technic. This article deals with experiments to determine what part prolonged incubation of the completed Kahn test plays in influencing the final results.

The standard method of reading the Kahn reaction (immediately following the shaking period) was compared with methods in which prolonged incubation periods were used. Overnight incubation at icebox (5° to 7° C.), room (about 22° to 28° C.), and incubator temperature (37.5° C.), were employed in these experiments. The incubation periods varied from 16 to 20 hours.

Six hundred and ninety-three completed Kahn tests were incubated overnight at icebox temperature (5°–7° C.), and the reactions compared with the standard method of reading. Table I shows that prolonged incubation at this temperature makes the test considerably more sensitive. Twenty-one per cent of the negative reactions became positive after this incubation period. Clinical data secured on some of the positive reactions gained showed them to be so-called

TABLE I

INCUBATION OF 693 KAHN REACTIONS OVERNIGHT AT ICEBOX TEMPERATURE

No. Specimens	Standard Method	Icebox Temperature	No. Specimens	Standard Method	Icebox Temperature
124	++++	++++	2	+	++++
8	++++	+++	6	+	+++
5	+++	++++	7	+	++
29	+++	++++	8	+	+
4	+++	++	7	−	++++
3	++	++++	5	−	+++
4	++	+++	8	−	++
6	++	++	34	−	+
1	++	+	432	−	−

"false positives." Some of the "weaker" positive reactions gained were secured from individuals who have had intensive anti-syphilitic treatment.

Of 521 tests incubated overnight at 37.5° C., 37 per cent of the positive reactions became negative after the incubation period. One negative reaction became 1 + after this period. The majority of these reactions can definitely be classed as "false" negative reactions. Table II shows the results obtained in this group of tests.

TABLE II

INCUBATION OF 521 KAHN REACTIONS OVERNIGHT AT 37.5° C.

No. Specimens	Standard Method	37.5° C. Temperature	No. Specimens	Standard Method	37.5° C. Temperature
46	++++	++++	2	+++	+
23	++++	+++	12	+++	−
1	++++	++	8	++	−
4	++++	+	1	+	+
10	++++	−	21	+	−
8	+++	+++	1	−	+
2	+++	++	382	−	−

Nine hundred and sixty-five tests were incubated overnight at room temperature (22°–28° C.). The readings at the end of this period corresponded very closely to the results obtained by the standard method. There is a tendency for the cholesterol to precipitate out of solution at the end of this period. The presence of this cholesterol simulates the specific precipitate so closely that it may be read as a positive reaction. Three 1 + reactions became negative at the end of the incubation period and two negative reactions became 1 + and 2 + respectively. Table III shows that reactions fluctuate in either direction, although the general tendency is for the reactions to become weaker at the end of the incubation period.

TABLE III

INCUBATION OF 965 KAHN REACTIONS OVERNIGHT AT ROOM TEMPERATURE

No. Specimens	Standard Method	Room Temperature	No. Specimens	Standard Method	Room Temperature
213	++++	++++	1	+	++++
5	++++	+++	2	+	++
35	+++	+++	39	+	+
1	+++	++++	3	+	−
1	+++	+	1	−	++
5	.++	+++	1	−	+
11	++	++	643	−	−
4	++	+			

CONCLUSIONS

When the completed Kahn test is incubated overnight at room, icebox, or incubator temperatures, the character of the reactions varies materially from those obtained in reading the test in the standard method. Incubation of Kahn tests overnight at icebox temperature tends to give false positive reactions. Overnight incubation at 37.5° C. tends to dissolve formed precipitates and give negative reactions. Incubation at room temperature has comparatively little effect on Kahn reactions. It appears that most reliable results are obtained when the Kahn test is read directly after the 3-minute shaking period.

REFERENCE

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Psittacosis

WE now have a record of 74 focuses of infection which gave rise to 169 cases, with 33 deaths, from November 23, 1929, to May 7, 1930. These cases occurred in 15 states and the District of Columbia and do not include 16 laboratory infections, with 2 deaths, nor 12 probable cases which were removed from two merchant ships entering our ports following exposure aboard ship to parrots purchased in Germany and Brazil. . . . Nevertheless, it was deemed desirable to determine the occurrence of illness among a control group of persons who had recently acquired apparently normal parrots. With this end in view, 103 parrots, a random sample, were traced to their ultimate destinations. These birds were sold by the same dealers and during the same time, November and December, 1929, as were many of the incriminated parrots. Eighty-eight of the 103 parrots were described as apparently in perfect health, and among the families exposed to them there was not a single suspected illness reported.

The remaining 15 parrots of the series either had died or were killed on account of illness. One of these birds had given rise to 6 cases of typical psittacosis. There was no human illness reported from contacts with the 14 other sick birds, of which the character of illness is of course unknown.

Parrots were associated with the development of 55 focuses of disease, parrakeets with 4, "love birds" 3, canaries 3, while in 9 outbreaks exposure was to multiple species.—Charles Armstrong, Surgeon, U. S. P. H. S., *Pub. Health Rep.*, Aug. 29, 1930.

Mobile Milk Laboratories

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THE New York State Department of Health was authorized by the last legislature to make a survey of the milk supply of the state. This survey will include inspections of farms, milk plants and ice cream plants and also laboratory examinations of milk and cream as delivered to the plants and as delivered to the consumer. This work is being carried on with the coöperation of the local health departments.

The purpose of the survey is to check up on the sanitary quality of milk and cream reaching consumers in the state and to develop a plan for a more complete, effective, uniform and practical control of this supply. The results of the survey will serve as a guide for future milk control work throughout the state.

In order effectively to carry out the survey program, a laboratory for the examination of milk and cream is necessary. Two mobile laboratories are now in operation. They are equipped to make both standard plate counts and direct microscopic counts. Standard street car type buses are used with all except the driver's seat removed. The clear space inside the bus is about 7′ wide, 18′ long and 6′ high for the installation of laboratory equipment. Laboratory benches are installed along each side and the back. A sink with running hot and cold water is

provided for washing laboratory glassware. A small water storage tank under air pressure serves as a source of water supply. Air pressure and water connections are located in the outside so that filling station service may be used. The water is heated by electricity and is stored in an insulated tank resembling a thermos bottle.

An electric meter is installed and long lead-in wires are provided for connecting with an electric power circuit. In this way, power is supplied when the bus is not running. This provides 110 volt current for operating the steam pressure sterilizer, sterilizing oven, Babcock tester for making butter fat determinations, heater for heating the bus when it is not in motion, water heater, refrigerator, fans and lights. The laboratory equipment includes an electric incubator operated by storage batteries which is automatically kept at body temperature for growing the bacteria found in milk.

Also included in the equipment are microscopes, an electric refrigerator, special gas burners supplied with compressed natural gas, and the necessary chemicals, glassware and supplies for carrying on various bacteriological and chemical tests.

All samples of milk and cream are either plated or examined under the microscope to determine the bacterial counts.

These laboratories will be stationed in each of the larger cities of the state and from these centers the survey will extend into the surrounding territory. Stops of either 1 or 2 weeks will be made, the length of the stay depending upon the amount of work to be done in each locality.

For the present, these laboratories will be used in carrying on the milk survey of the state. Eventually they will act as service laboratories, working in coöperation with health departments, milk plants and dairymen.

The Fatality of Scarlet Fever

A STUDY of scarlet fever in England confirms the general impression that for some 50 years past the fatality of the disease has been declining steadily. Here and there a higher mortality than expected is observed, but these few cases do not have a marked influence on the general trend.

Some of the reports are very striking—in one town, 210 cases with 1 death, in another an epidemic (number of cases not stated) with no deaths. In Liverpool, there has been a decline from 9.3 mortality per 100,000, in 1919, to 1.7 in 1929, though there were two years intervening in which the death rate had no decline. From a number of other towns there are reported epidemics with a general mortality of slightly over 1 per cent.

The reports do not seem to give any safe ground for forecasting, but they demonstrate certainly that scarlet fever is now a much milder disease than it has been in the past.

EDITORIAL SECTION

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THE AIRPLANE AND YELLOW FEVER

IT is well known that contagious disease travels at the rate of human transportation. Modern developments have changed many of our conditions, in some cases for the better, but in many for the worse, so our ideas and practices must be modified to meet these.

The substitution of steam for sail has brought us into very much closer contact with every part of the world, and the diseases indigenous to one country are becoming common possessions of all countries engaged in commerce.

The most recent problem is the airplane, and this has come up for discussion before the International Office of Public Hygiene, which has been attempting to draft a program to prevent the spread of yellow fever by this means. While it has been shown that the carrying of adult mosquitoes on vessels is not the danger it was once supposed to be, nothing is known of airplane conditions, though there is a rather general belief that a real danger exists. Apart from the carrying of infected insects, passengers may well carry the infection. To avoid this danger, an article in the regulations imposes on passengers from infected areas a period of observation of 6 days before embarkation, and a further period of observation of 6 days upon arrival. As all studies so far have shown that the infective period of yellow fever is only 3 days, it is possible that these proposals may be modified. The Conference of 1926 fixed 5 days as the infective period on the suggestion of Dr. Chagas, and at the last meeting of the Quarantine Com-

mission on Aerial Navigation, May 14, 1930, modification was opposed until the delegates from South America who were not present could have an opportunity of discussing this point.

There has already been established in South America a hydroplane service route along the coast across the yellow fever regions, for which the points of departure and landing are entirely on the sea. This may lessen the danger, but certainly does not do away with it, in view of the embarkation and landing of passengers. The matter is one of extreme interest and possibly great importance from the public health standpoint. New methods of transportation require new studies and new rulings.

THE AMERICAN HEALTH OFFICER AND HIS EUROPEAN BROTHER

THIS summer, more than a hundred American public health workers visited the International Hygiene Exhibition at Dresden and called on many of their confrères in European health services. What did they observe? What did they learn? Certainly they could not have avoided an observation which to one traveler at least seemed very obvious—that American health officers are particularly fortunate to have a country like the United States in which to work. Their job is made infinitely easier and more effective because the standard of life of the great mass of people is on a relatively high level. In fact, the higher standard of living may be what has made possible most of the health work so characteristic of America today; it is part of the service which the American standard requires!

The countries of central, southern and eastern Europe present a striking contrast in this regard. To a very large extent, they appear to have overcome the immediate effects of the war. Nevertheless, one cannot avoid the conclusion that their populations are still suffering seriously from a poverty which verges very close on destitution. Housing, with the exception of a few isolated instances, as in Berlin, Vienna and Rome, is generally unfavorable to the development of good health. Illiteracy is far too prevalent, while undernourishment and malnourishment are frankly in evidence. Under conditions of this sort, it is amazing that health officers have been able to accomplish as much as they have in many European countries. Imagine the difficulties that are met with in developing a campaign against tuberculosis in the manner that it has taken hold with us. We emphasize the instruction of the people in personal hygiene and prescribe adequate nutrition, rest, good housing, and plenty of sunlight and fresh air as

preventives. Or consider the essentials in reducing high infant mortality. They call for much the same prescription plus the enforced rest of the mother during pregnancy and the necessary freedom from arduous toil later to permit breast feeding for a large part of the first year of the baby's life. To launch an effective tuberculosis or infant mortality campaign in Roumania or Greece, for example, is close to wishing the job of Tantalus on a helpless and impoverished people. Health officers can accomplish little under conditions such as prevail in most European countries.

Public health, in other words, does not stand alone. It is dependent upon the whole pattern of life. It exists as part of the life which a people can afford. It flourishes when the economic level is high; it is retarded almost to the point of extinction when standards in general are low. No one will ever be able to analyze all the factors that have entered into the extraordinary extension in life expectation and in freedom from disease which characterize the average American. Many elements have gone into making our country what it is from a public health standpoint; but obviously not the least has been the constantly advancing level of well-being for the common man and his freedom from destitution and its consequences.

We have been particularly fortunate that from the beginning it has been an article of our political faith not to stratify our population into classes. The working people made the nation, shaped the direction of government so that it included health protection, and, moreover, generated the money income which pays for such protection. On the other hand, many European countries still suffer from the implied assumption that those who work with their hands must be poor, that they belong to a lower order of nature, destined with their children to remain in that station in life to which they were born; and, worst of all—not entitled to the equal benefit and protection of governmental service. So long as such a philosophy of government holds, and unfavorable economic conditions characterize the great mass of people, death and sickness rates will continue to be high. A vicious circle is established—poverty leads to inability to support public health work and this, in its turn, makes it difficult to escape from the very unfavorable situation to which much of the poverty is due.

Health officers in the States should, therefore, realize how fortunate they are in dealing with a relatively well fed and well clothed, literate and progressive population. There is scarcely a limit to the amount of service that is available for development under such conditions. Public health work costs money. It is available to us and has proved its worth. There is little excuse for some of the unfavorable

health situations that we still have with us. The visit of our health officers to less fortunate European cities should stimulate a new spirit of activity and progressive work in many corners of our country.

VACCINE AND VACCINATION

A WRITER in the *Medical Officer* protests against the use of the words "vaccine" and "vaccination" for any material or immunization process except calf lymph and its use against smallpox, holding that it leads to confusion and misunderstanding.

The word vaccine is derived from the Latin "vaccinus," of or from cows, this in turn being derived from "vacca," a cow. According to the etymology, the term should be limited to calf lymph prepared for protection against smallpox.

An examination of a number of American dictionaries makes this perfectly clear, but all give as a secondary meaning any substance for preventive inoculation. One of the most advertised dictionaries even includes the word "bacterin" in its definition, though we believe that this term was originated by a certain firm as a trade name.

In these days when the study of Latin and Greek is decadent, the derivation of words means little to the average reader or writer. While our sympathies are entirely with the writer in the *Medical Officer*, we must point out that usage determines the meaning and use of words. Many examples can be given showing complete changes from the original meaning; for example, "idiot," derived from the Greek word meaning a private person, and "manufacture," meaning to make by hand. At present, when manufactured articles are made by hand, the fact is usually advertised. We might now well define manufacture, to make by machinery. Language grows, and words change in meaning, but this is no excuse for the barbarisms which are so common.

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PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

Public Health Administration in Syracuse, N. Y.—In 1923 diphtheria immunization work began in earnest in Syracuse. From that year through 1929, there have been given 27,372 protective treatments. Except during 1924 no effort has been made to re-Schick the children to determine the extent of immunity conferred. However, of the 19 deaths which have occurred in Syracuse during the past 5 years, only 1 child among those receiving the full course of treatment contracted diphtheria and died.

In 1929, three treatments of toxin-antitoxin were administered to 8,023 children, of which number 4,255 were 5 years of age or under. In 1929 there were only 27 cases of diphtheria reported, which is less than half the number reported in 1928.

Syracuse has not had a single case of smallpox during 1929 and it is now 41 years since a death occurred from this disease.

In 1929 there were known to the Health Department 716 active cases of tuberculosis compared with 1,076 in 1928. Of the deaths in 1929, 81.4 per cent were reported as cases prior to their death. It was also found that 37.2 per cent were reported a year or more before death of the patients.—George C. Ruhland, *Annual Rep.*, Dept. of Health, 1929.

Typhoid Fever Spread by Lobster—During the month of July, 1929, there were 9 cases of typhoid fever in four neighboring communities, epidemiological investigation indicating that the common food had been lobster coming from the same source of supply but distributed through four stores.

A man employed in the room in which the lobsters were handled, sorted, and stored, had died of typhoid fever early in July. The empty barrels in this storeroom were not cleaned with any regularity but were foul with slime and filth and formed ideal culture mediums for any chance contamination.

While it is not possible to state just how the lobsters became infected, it is presumed that the lack of sanitation at this packing house was the direct cause of the food becoming contaminated. It is believed that the part of the food actually consumed, that is, the lobster meat, had not been originally contaminated, but that contamination from the barrels upon the lobster shells had been transferred from the shells to the meat by the fingers of handlers in the course of preparation or consumption.—G. W. Anderson and C. L. Scamman, Typhoid Fever Apparently Spread by Boiled Lobster, *J. Prev. Med.*, 4, 405 (Sept.), 1930.

Diphtheria Immunization in Detroit, Mich.—The Health Department continues to carry on its program of prevention solely through the medium of the family physician. During the past two years, no immunizations have been given by the Health Department, not even to indigent families. The Health Department reimburses the physician at the rate of 50 cents for each dose of toxin-antitoxin for the children of indigent or near indigent families.

During the summer months of July and August, 50 school nurses did house-to-house canvassing in districts where

the diphtheria death rate is above the city average. There were 23,748 children whose parents were interviewed. Of this number 9,084, or 38 per cent, had previously received three doses of toxin-antitoxin. Of the remaining 14,664 children whom the nurses have attempted to have immunized, 5,777, or 39 per cent, have completed the course of treatment and the reports are not as yet complete. This brings the percentage of immunized children in these districts up to 62.6.

A combination of summer vacations and hard times has apparently delayed familial coöperation to some extent. Among those interviewed, 3,080, or 21 per cent, refused to have their children protected immediately because they were going away for the summer or could not take care of it on account of illness in the family. Others would not go to the family physician because they felt that they could not afford the preventive service and were unwilling to accept charity. Thirty-eight per cent definitely refused to consider diphtheria protection for their children.

It is encouraging to note that of the children immunized due to the nurses' educational program, 67 per cent were under 6 years of age. All of the immunizations were given in the office of some one of the 900 coöperating physicians, the nurses having been provided with complete lists of all such physicians. —*Detroit Health Dept. Weekly Rev.*, 11, 38 (Sept. 20), 1930.

Health Administration in Dayton, O.—In 1929 the per capita expenditure of the Health Department amounted to 62.4 cents compared with 44 cents in 1920. The Commissioner of Health is responsible to the Director of Public Welfare, there being no Board of Health nor advisory council. Effort is made to inspect and score the 2,565 dairies producing milk for the city each year. The 58 milk plants in which 99½ per cent of the supply is pasteurized are regularly supervised by inspection and by laboratory analysis of the product.

Examination is made in the laboratory of utensils, such as spoons, forks, or glasses which are taken from food establishments, wrapped in sterile towels and brought to the laboratory for examination. This system is proving a very effective method of checking the cleanliness of eating and drinking utensils and bacteria count. The results of this checkup, which has been in use since 1925, are published monthly and furnished to all who desire them.—A. O. Peters, Health Commissioner, Dayton, O.

Whooping Cough—The positive organism in whooping cough was isolated by Bordet and Gengou 24 years ago and it has been 14 years since Chievitz and Meyer developed their simple method for early diagnosis. Whooping cough can now be diagnosed before the lymphocytosis and whoop. Two hundred cases which have been seen in private practice have been analyzed with respect to bacteriological findings. The diagnostic plate was positive in all but 1 of 53 patients in the catarrhal stage. Of 107 cases in the paroxysmal, 70 had positive plates representing 65 per cent of the total in this group. Of 40 cases studied bacteriologically in the period of decline, none showed positive plates. —L. W. Sauer, L. Hambrecht, Whooping Cough, Early Diagnosis by the Cough Plate Method, *J. A. M. A.*, 95, 263 (July 26), 1930.

Health Examination in Newark, N. J.—In 1929 the personnel of the Health Department totaled 235, organized into ten functional divisions, including: Administration (18), Communicable Disease (21), Venereal Disease Control (19), Tuberculosis (15), Child Hygiene (29), School Health Service for Parochial Schools (9), Laboratory (31), Food (45), Sanitation and

Plumbing (46), Dispensary (22).

The total expenditure of the Health Department amounted to $560,000 or $1.27 per capita, including 6 cents for plumbing inspection and 9 cents for the relief of sick poor. A total of 1,005 cases of tuberculosis with 441 deaths indicates better than average reporting for cities of this class.—C. V. Craster, Health Commissioner, Newark, N. J.

Children's Fund of Michigan—On April 30, 1930, the first year of the Children's Fund of Michigan was completed. Senator James Couzens of Michigan made a gift of $10,000,000.00, dedicated to the welfare of children. Dr. Hugo A. Freund is President of the Board of Trustees and William J. Norton is Secretary of the Board.

There was organized in September, 1929, a division of child health under the administration of Dr. Bernard W. Carey, under whose direction there has been established a Child Health Demonstration in Menominee County. Two consolidated health units have been established in the lower peninsula, each of which includes four counties which, for the present, are without adequate economic resources to finance necessary health service individually.

A special oral hygiene program of extensive character has been inaugurated as well as a county nursing program, mothers' classes in child hygiene and a program of health education. In initiating its program, the Fund has given special attention to research problems in dental hygiene, to the care of dependent and delinquent children and child guidance clinics.—*First Annual Report of the Children's Fund of Michigan*, Detroit, June, 1930.

Meningitis in Detroit, Mich.—Meningococcus meningitis has been epidemic in Detroit since 1928. In June, 1930, the outbreak was still continuing without evidence of early limitation. Fulminating infections were not encountered until four months after the first increase in the number of reported cases. They continued relatively uncommon during the first year of the epidemic, increased during the second year, and were most numerous during the early part of the third.

Abortive forms of meningococcus infection were encountered during the epidemic period, clinically corresponding to a mild nasopharyngitis. The disease may be limited to a septicemic stage, but is more commonly recognized as an infection of the meninges. Meningococcus meningitis may evidence a rapidly fatal fulminating course, or, more commonly, a slower evolution, or it may, in the absence of specific treatment, lapse into a chronic state with subsequent acute recurrence—J. E. Gordon and J. F. Norton, Meningococcus Meningitis in Detroit in 1928–1930, *J. Prev. Med.*, 4, 339 (Sept.), 1930.

LABORATORY

C. C. YOUNG, D. P. H.

A STERILE DISPENSING FUNNEL

G. D. CUMMINGS

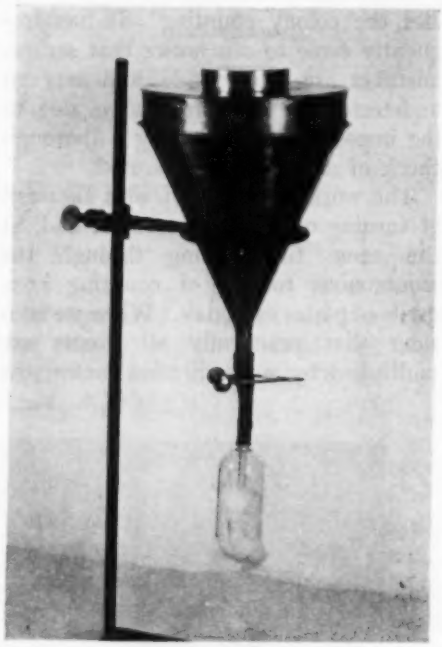
Michigan Department of Health, Lansing, Mich.

THE media division of this laboratory has used the sterile tubing funnel shown in the figure for a number of years for dispensing mediums into tubes or flasks which cannot be sterilized after the addition of enrichment substances.

Included in this group are such mediums as plain and chocolate blood agar, ascitic fluid, carbohydrate semi-solid agar, and cystine glucose agar. The procedure in the preparation of any of the above ordinarily calls for the addition to the sterilized and cooled agar or broth base of the sterile enrichment agent. Unless a suitable apparatus is available for dispensing the medium, the latter must be transferred from bottle to tube by direct pouring. This method is unsatisfactory because continual flaming usually cracks the bottle neck, and as the agar or broth to be dispensed is sometimes moderately hot the direct handling of the container is uncomfortable.

The funnel here shown is made of sheet copper and tin lined. The top is soldered on so that the opening into the funnel consists of a soldered brass collar 2½" in diameter in the center of the top surmounted by a tightly fitting brass and monel metal cap. A Mohr pinchcock, a length of rubber tubing, and a straight sided filling bell complete the outfit.

The particular funnel shown was designed to contain 1,000 mils and cost $2.00, including the materials and labor.



The funnel is rinsed out and washed immediately after use so that no opportunity is available for agar or gelatin to solidify inside. The filling bell is freshly plugged and the apparatus sterilized for 30 minutes at 15 lb. pressure. Once sterilized, the funnel may be placed in a cupboard until used again. Experience has shown that it

will remain sterile indefinitely.

With a battery of such funnels, the task of dispensing enrichment mediums into tubes, flasks, or Blake bottles may be performed with great ease and excellent asepsis.

AN AID TO MORE ACCURATE COLONY COUNTING

M. O. ROBINSON, V.M.D.

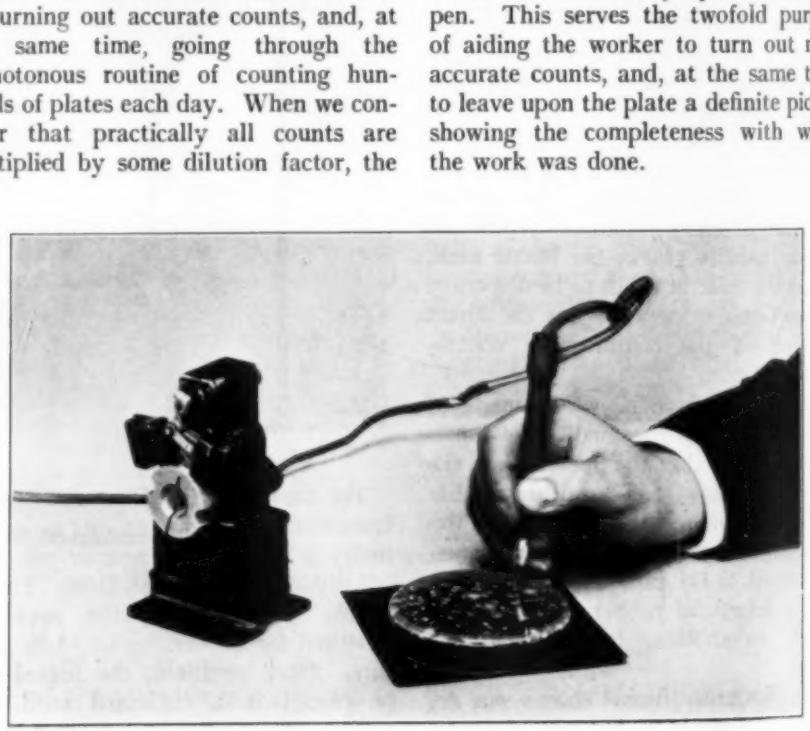
Director of Laboratories, Scott-Powell Dairies, Philadelphia, Pa.

IN routine laboratory work much depends upon the individual who handles the colony counting. It has frequently come to our notice that serious mistakes are often made, and may go undetected by those in charge, due to the impossibility of making a thorough check of all the plates counted.

The workers are faced with the task of turning out accurate counts, and, at the same time, going through the monotonous routine of counting hundreds of plates each day. When we consider that practically all counts are multiplied by some dilution factor, the possibility of grave errors in the final reports assumes large proportions.

Actually to check the work is no small problem, and probably very little checking is done.

In order to relieve the monotony, and to increase the rapidity and accuracy with which counts can be made, we have devised an electrically operated contact pen. This serves the twofold purpose of aiding the worker to turn out more accurate counts, and, at the same time, to leave upon the plate a definite picture showing the completeness with which the work was done.



The outfit consists of an electric tally apparatus, a special pen holder, and an ordinary pen point. Current is obtained directly from the lighting circuit.

Within the barrel of the pen holder there is a contact arrangement which completes the circuit when the point of the pen is pressed against the glass dish. In this way, we have the count recorded upon the tally apparatus, and the colonies which have been counted definitely marked.

Our plates are counted by placing them, inverted, over a Stewart counting chamber. The operator marks the colonies with the pen, using ordinary writing ink. In this way, a mark is made over the colony at the time of counting, which serves as a check on the number counted, and shows at a glance the completeness with which the work has been done. This has been of great assistance in checking where large numbers of plates are counted each day, as it leaves a definite record upon each plate counted.

The adoption of the electrical counter seems to be a step ahead of other methods in use. With the count being recorded during the marking process, it reduces the possibilities of error to a minimum. We find that workers are able to count for hours, without experiencing the mental fatigue and inaccuracies of other methods.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Health Conditions in India—The birth rate for India in 1927 was 35.27 per 1,000, which was above the ratio of the two previous years; the death rate was 24.89, representing a fall from 1926. The infant mortality rate was 167 per 1,000 live births. Over 8,000,000 persons were treated for malaria in 1927. Respiratory diseases accounted for the highest death rate of the country, being between 8 and 16 per 1,000 population.

Tuberculosis varied from 8.4 per 1,000 for Kashipur in the United Provinces to 1.6 in the city of Bombay. There were 780,000 anticholera inoculations performed in 1927 in Bengal, which had suffered a mortality of 120,000 or an increase of about twice the usual mortality. Plague had the lowest mortality in 1927 for the last 30 years.

There has been a steady rise in mortality from smallpox since 1921. There were 2,342 deaths from rabies. The total number of patients treated in state and private civilian hospitals and dispensaries came to over 4,600,000.—*J. A. M. A.*, 95: 603 (Aug. 23), 1930.

The Development of Maternity Work in China—The urgent need for midwifery training in China has come to the attention of the government. China at present has deplorably high maternal and infant mortality rates as compared with other countries. The maternal mortality is 15 per 1,000 and the neonatal mortality at least 250 per 1,000. Midwives have been a part of the social economy for years but only sporadic attempts have been made to control and register them.

Recently, a real attempt has been made and a board formed, under the Nationalistic Government, to draw up plans and regulations for schools of midwives. It is estimated that there are

200,000 old-type and 500 modern-trained midwives. To make registration possible, requirements will have to be lowered to include all the former groups. Under present conditions, China will have to be content to register about 85 per cent of those acting as midwives. But a real beginning has been made and the work will undoubtedly progress steadily in spite of political changes.—J. P. Maxwell, *Brit. M. J.*, 2: 184–185 (Aug. 2), 1930.

Life and Death in Harlem—A study of the 21 sanitary districts comprising the North Harlem district of New York City showed that the inhabitants have hazards two to three times as great as other inhabitants of the city. For every major cause of death, figures for North Harlem exceeded Manhattan and the city as a whole.

The birth rate for North Harlem is at least 5 per cent above that of New York City, the rates being 23.0 for Harlem; 24.4 for Manhattan; and 21.9 per 1,000 population for New York City. The infant mortality rate is 111 per 1,000 births, an excess of 65 per cent over the average city rate. The pneumonia rate is exceptionally high, 256 per 100,000. Pulmonary tuberculosis averaged 368 deaths annually with a rate of 193 per 100,000 population for the 5-year period 1923–1927. Maternal mortality in Harlem is 10.1 compared with 4.8 in Manhattan and 5.1 per 1,000 live births in New York City.

The diphtheria rate in Harlem is not in excess of the general figure, but whooping cough is in the ratio of 2 to 1 in excess for the colored. North Harlem shows a lower suicide rate than Manhattan, and a point lower than that for the city. The homicide rate for Harlem is almost double that for Manhattan, and more than 3 times the city's rate. The cancer rate is more favorable than for Manhattan. Puerperal diseases and malformations at birth have a higher rate but diarrhea and enteritis have a rate 2 points below Manhattan.

There were 1,839 deaths from pulmonary tuberculosis in North Harlem from 1923 to 1927, the rate for the 5-year period being 193 per 100,000, compared with 115 for Manhattan and 81 for the city. The rate for Harlem gradually increased over the 5-year period while in Manhattan it remained almost constant and in the city showed a gradual decline.—W. B. Nathan, *J. Outdoor Life*, 27: 541–544 (Sept.), 1930.

Cancer Record for 1929—The cancer death rate of 49 American cities increased from 71.6 per 100,000 population in 1906 to 117.8 in 1929, representing an average annual increase of about 2½ per cent. The number of cancer deaths in Massachusetts, where possibly the most determined effort against cancer control is in progress, increased from 5,611 in 1928 to 5,672 in 1929, in Maine, from 1,069 in 1928 to 1,120 in 1929.

Statistics for 146 cities showed the cancer rate stationary for the past two years, 114.4 per 100,000; however, the actual number of cancer deaths in these cities increased from 43,426 to 44,262. Of these 146 cities, Portland, Me., reported the highest cancer death rate in 1929, 187.5 per 100,000 population. In the five cities with populations over 1,000,000 or more, the number of cancer deaths rose from 16,120 in 1928 to 16,481 in 1929. Philadelphia reported a rate of 126.3 in 1929; Los Angeles, 124.9; New York, 113.9; Chicago, 106.1; and Detroit, 73.1.

In 1928, cancer had reached the status of being the third leading cause of death in the United States Registration Area, the rate being 96 per 100,000 according to the U. S. Bureau of the Census. The cancer rate for 17 Euro-

pean countries for the period 1921–1927 showed a range of from 141.9 per 100,000 for Switzerland to 61.8 for Italy. For the same 7-year period in 9 non-European countries, the rate reached a maximum of 90.6 per 100,000 in Australia, and a minimum of 12.3 for the Republic of Salvador. In practically all of these countries, the cancer death rate continued to increase from year to year during the period dealt with.

Two illustrations show the nature of the local cancer problem as to organs affected. The proportion of deaths from cancer of the buccal cavity in the total mortality from all forms of cancer varied, for males, from 50.4 per cent for Ceylon, to 2 per cent for Chile. The proportion for the white population of the United States was 6.1 per cent; for American negroes, 5.6 per cent; for American Indians, 5.5 per cent; and for American Chinese, 2.3 per cent. The range for cancer of the stomach and liver, for males, varied from 83.4 per cent for Japan to 22.5 per cent for Ceylon. United States showed proportions from 44.8 per cent for the white population to 59.6 per cent for American Chinese.—F. L. Hoffman, *Spectator*, 125-3-20 (Aug. 14), 1930.

MORTALITY STATISTICS: 1929

Pennsylvania—The Department of Commerce announces that there were 117,365 deaths in Pennsylvania during 1929 as compared with 119,607 in 1928.

For the 4-year period 1926 to 1929, marked decreases were shown for measles, from 1,058 deaths in 1926 to 367 in 1929; typhoid and paratyphoid fever, from 357 to 199, whooping cough, from 927 to 575, and diphtheria, from 800 to 689. Deaths from tuberculosis, all forms, diarrhea and enteritis, under 2 years, and congenital malformations and diseases of early infancy showed continual decreases from 1926 to 1929.

The deaths reported from meningococcus meningitis in 1928 and 1929 were nearly 3 times as many as in 1926 and 1927. The four outstanding causes of deaths were diseases of the heart, pneumonia, all forms, nephritis, cancer and cerebral hemorrhage.

While the deaths from all accidental unspecified external causes showed a total increase of only 83 in 1929 as compared with 1928, those from automobile accidents increased by 277 and from machinery accidents by 38; these increases were principaliy offset by decreases in deaths from drowning, mine accidents, and railroad and street car accidents.

Wyoming—There were 2,010 deaths in Wyoming during 1929 as compared with 2,155 in 1928.

A comparison of the deaths in 1929 with those in 1928 showed decreases in such important causes as whooping cough, influenza, tuberculosis, all forms, cancer, cerebral hemorrhage, pneumonia, all forms, and nephritis.

Increases in deaths from 1928 to 1929 appeared for syphilis, appendicitis and typhlitis, and diseases of the heart; for the last cause the increase has been continuous from 1926.

The deaths from accidental and unspecified external causes increased from 253 in 1928 to 284 in 1929, the greatest increase among these appearing for automobile accidents (59 to 73).

Massachusetts—Massachusetts has reported 51,916 deaths during 1929 compared with 51,034 in 1928.

Diseases of the heart alone caused over one-fifth of all deaths reported in the state and show an increase for each succeeding year.

Deaths from influenza and its associated disease, pneumonia, were 900 more in 1929 than in 1928, and this combination of diseases was the cause of the second greatest number of deaths.

For the 4 years 1926–1929, cancer has shown a continuous increase from year to year and now ranks as the second single greatest cause of death.

The diseases mentioned above, with

cerebral hemorrhage and softening, and tuberculosis, which has shown a decrease for each of the 4 years reported, caused approximately three-fifths of all of the deaths reported for the year. In addition to tuberculosis, decreases from 1926 to 1929 were shown for diarrhea and enteritis, under 2 years of age, nephritis, and congenital malformations and diseases of early infancy.

In the epidemic diseases, decreases were in measles, scarlet fever, and whooping cough.

Among accidental and unspecified external causes, deaths from drowning decreased from 315 in 1928 to 254 in 1929. Deaths due to accidental falls increased from 731 to 772. There was a slight decrease in the number of deaths due to street car accidents, and the number due to automobile accidents increased from 724 to 781, a continuous increase for each of the 4 years.

Minnesota—There were 25,092 deaths in Minnesota during 1929 as compared with 25,977 in 1928.

Though the total number of deaths in this state has remained practically the same for the 4 years 1926–1929, there have been a number of decided changes in the diseases causing death. For the years 1929 and 1928, the numbers of deaths due to influenza were nearly double the numbers reported from 1926 and 1927. These large increases and the increase due to deaths from automobile accidents more than offset the decrease due to deaths from other causes. The number of deaths from measles increased from 13 in 1928 to 84 in 1929, but this latter figure compares very favorably with the 175 deaths from this disease in 1926. The great decrease in deaths from diphtheria during the 4-year period is very satisfactory and is in step with similar reports from other states. Cancer is each year taking a larger toll of deaths and next to diseases of the heart is the outstanding cause of death.

The important diseases for which less deaths were reported in 1929 than in 1928 were acute anterior poliomyelitis, 59 to 6; diarrhea and enteritis, under 2 years of age, 198 to 135; puerperal causes, 280 to 201.

The decrease in deaths from railroad and street car accidents was more than made up by the deaths from automobile accidents.

Vermont—The Department of Commerce announces that there were 5,295 deaths in Vermont during 1929 as compared with 4,888 in 1928.

The causes which took the greatest toll of life were those diseases which affect persons of older ages, namely, diseases of the heart (1,092), cerebral hemorrhage and softening (516), cancer (465), and nephritis (445). The first two causes alone were responsible for nearly one-third of the deaths in the state.

The deaths from influenza in 1929 more than doubled the number in 1928, and other increases were from pneumonia, all forms, and diarrhea and enteritis under 2 years. Decreases were shown for tuberculosis, all forms, and diabetes mellitus.

Among the deaths from accidents, decreases appeared for drowning, machinery accidents, and automobile accidents, and increases for burns and shooting.

Kentucky—There were 31,109 deaths in Kentucky during 1929 as compared with 30,390 in 1928.

Very appreciable decreases in deaths in 1929 as compared with 1928 appeared for typhoid and paratyphoid fever, measles, syphilis, pellagra, diarrhea and enteritis, under 2 years, and congenital malformations and diseases of early infancy, and comparatively slight decreases were shown for tuberculosis, all forms, cancer, pneumonia, all forms, and nephritis.

Notable increases were those from influenza, which in 1929 caused nearly twice as many deaths as in 1928, and

from meningococcus meningitis, which more than doubled the number of deaths in 1928. Other increases were reported from scarlet fever, whooping cough, diabetes mellitus, and diseases of the heart, the last of these being the outstanding cause of death.

Total deaths from accidental and unspecified external causes showed only a slight increase in 1929 over 1928, but the increase in automobile accidents was large (342 to 389) and accidental shooting and railroad accidents also showed a larger number in 1929; a noticeable decrease was reported in deaths from mine accidents.

Michigan—Michigan has reported 56,118 deaths during 1929 as compared with 54,794 in 1928.

The total increase in deaths in 1929 as compared with 1928 was 1,324, nearly half of which was accounted for by the appalling increase in deaths from meningococcus meningitis, from 189 to 812, and two-thirds of these deaths occurred in Detroit alone (542). Other increases were shown for diphtheria, influenza, diseases of the heart, appendicitis and typhlitis, cancer, and diabetes mellitus; for the last two of these causes the increase was continuous from 1926. The deaths from suicide also increased during each year for this period.

Notable decreases from 1928 to 1929 appeared for measles, scarlet fever, pneumonia, all forms, and nephritis.

The deaths from accidental and unspecified external causes increased in 1929 as compared with 1928, the principal increases appearing for accidental drowning and automobile accidents; decreases were shown for railroad and street car accidents.

Kansas—The Department of Commerce announces that there were 19,392 deaths in Kansas during 1929 as compared with 20,946 in 1928.

While deaths from typhoid and paratyphoid fever and measles showed increases in 1929 over 1928, there was a very big decrease from 1926, and whooping cough, which showed a decrease from 1928 to 1929, 91 to 80, was responsible for 120 deaths in 1926.

The most notable decrease in deaths in 1929 as compared with 1928 was that from influenza from 1,472 to 869; other very important decreases were from tuberculosis, all forms, cancer, diseases of the heart, pneumonia, all forms, diarrhea and enteritis, under 2 years, nephritis, and cirrhosis of the liver.

Among increases in deaths were those from meningococcus meningitis, scarlet fever, and diabetes mellitus.

The increase of 131 deaths from 1928 to 1929 from accidental and unspecified external causes was more than accounted for by increases in deaths from accidental drowning (75 to 85), accidental shooting (41 to 70), mine accidents (16 to 24), machinery accidents (31 to 50), and automobile accidents (304 to 373).—U. S. Department of Commerce, Bureau of the Census. Provisional Summaries.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

Mosquito Control on Water Supply Reservoirs—Mosquito control may be effected by clearing the edges of ponds or reservoirs to eliminate floatage, by varying the water level 6″–8″ to strand larvae, by destroying the larvae with gambusia affinis, and by the use of mineral oil. The use of mineral oil is claimed to be unobjectionable to water users. It is generally used in the upper reaches of the pond or reservoir and remains on the surface, whereas intakes are usually below the water surface.—E. W. Constable, *Water Works Eng.*, 82, 1929. From papers of Water Pollution Research Board, England.

Some of the More Recent Aspects of Sewage Chlorination—The amount of chlorine to be added for the proper disinfection of sewage varies with conditions of sewage and temperature, but 0.2 p.p.m. should be present after 10–15 minutes. Solution feed is recommended in preference to direct feed apparatus, since, when over 3.5 p.p.m. of gas are fed directly, damage to equipment may result from escaped gas. Chlorine may be added either to the plant influent or effluent. Direct feed apparatus may be used when an addition of not over 3 p.p.m. of chlorine is required. Disintegration of concrete, often due to the presence of hydrogen sulphide, may be prevented by chlorination.

Prechlorination is claimed to have no harmful effects on sludge digestion, but rather to hasten it, prevent foaming in Imhoff tanks, and reduce the 5-day biochemical oxygen demand of sprinkling filter effluents. The construction of secondary treatment facilities may be postponed or avoided by chlorinating the effluent from settling tanks.—L. H. Enslow and J. A. Strange, *Fourth Annual Report of the Missouri Water and Sewerage Conference* from Papers of Water Pollution Research Board, England.

Engines Run on Sewage Gas—At the sewage works of Charlotte, N. C., gas is collected which contains about 70 per cent of methane, averages about 800 B.t.u. per cu. ft. in calorific value, and amounts to about 0.3 cu. ft. per head of the population per day. The gas is utilized in internal combustion engines and the heated water from the jackets is used, supplemented in cold weather by exhaust gas heaters, to maintain the required temperature in the sludge digestion tanks. A 10 per cent reduction in operating expense has been effected by the use of the gas.—*Power*, 69, 1929. From papers of Water Pollution Research Board, England.

The Treatment of Water and Waste Water with Chlorine and Copper and Chlorine and Silver—An apparatus is described and illustrated for the simultaneous addition to water of chlorine and copper or silver. Chlorine gas passes from a cylinder through a control system to a vessel where it is dissolved in a small quantity of water. The solution can be divided as required, part passing directly to the water to be treated, while part passes through another vessel containing silver and copper waste, carrying some of this in solution to the water.

Experiments are described on the

treatment with chlorine and copper of the water for use in a cellulose factory and the effluent from a paper factory. In the first case the water was drawn from a river so much polluted with trade wastes that neither chlorine nor copper sulphate sufficed to control growths of fungi and algae.

Combined treatment with 2.5 gm. of chlorine and 0.18 gm. of copper per cm. of water was entirely successful. Intermittent treatment of the clarified effluent from a paper factory was successful in preventing growths in a stream. The chlorine and silver combination was tested in river water with a very high content of bacteria and suspended matter.

Tests were made of the raw water and of the water after chlorine alone and silver and chlorine had been added on the suction side of the pump drawing from a well. The results of the bacterial counts and the coli-titer are given in tables. At first the quantities of silver were too small to increase the effect of the chlorine, but on raising the quantity of silver or adding ammonia the chlorine effect was increased.

The amount of suspended matter caused slowness in the action, but when the water was filtered sterilization took place much more quickly.—G. Ornstein and R. Kroke, *Gesund-Ing.*, 53, 1930. From papers of Water Pollution Research Board, England.

Pollution of Abandoned Well Causes Fond du Lac Typhoid Epidemic—An account is given of the report of Warrick and Tully on the cause of the typhoid outbreak at Fond du Lac, Wis., in 1929. The water supply is drawn from wells, five of which are situated at the water works. Bacterial examinations proved these wells to be polluted.

Information was received of the existence of an abandoned private well in a new channel of the Fond du Lac River, some 800 ft. from the wells. The river receives tannery waste and sewage. Salt tests gave evidence of underground connection between this well and the wells at the works.

The old well casing was treated with chloride of lime and air tests were made for seams in the river channel. The old well was then filled with concrete and capped, the reservoir was cleaned and disinfected and the water mains flushed.

The discharge from the water works wells improved immediately the old well was capped, but all city water is now chlorinated and private wells in the neighborhood are carefully tested and controlled.—*Eng. News-Rec.*, 104, 1930. From Papers of Water Pollution Research Board, England.

Bacterial Contamination of Baths—Examinations of samples of water from swimming pools which are not subjected to filtration or chemical treatment, and from those which are treated by continuous filtration and chlorination, have shown that *B. coli* multiply rapidly during the night in swimming baths, but streptococci do not. It is suggested that a better index of pollution is formed by an estimation of streptococci by glucose and lactose broth than by an estimation of *B. coli*. It is concluded that while the *B. coli* content is not a universally reliable index of intestinal pollution, streptococci are constant indications of such pollution, and that although *B. coli* do not necessarily indicate pollution or danger, their absence is an excellent index of safety.—*Brit. M. J.*, 3593, 1929. From papers of Water Pollution Research Board, England.

Treatment of Dairy Wastes—The strength of milk-product waste depends primarily upon the buttermilk and whey content and may be 10 times the average for domestic sewage. The treatment of weak and concentrated dairy waste

is discussed. Reference is made to previous investigations which have shown that Imhoff tanks are unsatisfactory but that a purification of 80–98 per cent, based upon the organic nitrogen, is effected by septic tanks with 24–72 hours' detention, followed by sand or trickling filters. Concentrated wastes can be recovered, utilized as hog food, or dried.

Experiments were carried out on the chemical treatment of concentrated wastes at two New York State plants; 0.5–1.0 per cent of 95 per cent lime by weight was added to the raw waste, which had an acidity ranging from 1,000–6,500 p.p.m.

The sludge dried readily on sludge beds to about 46 per cent moisture and the clarified effluent showed a reduction of 86 per cent in organic nitrogen and 82 per cent in oxygen consumed.—C. L. Walker, *New York State Sewage Works Assn.*, Oct., 1929. From papers of Water Pollution Research Board, England.

Water Supply and Sewerage of Large Japanese Cities—The author gives an account of the water supplies, sewerage systems and sewage treatment works of the large cities of Japan. Water works methods are up to date and a high standard of water is generally supplied. Surface water treated by slow sand filtration is most usual, but rapid sand filtration is being introduced.

Sewerage systems have reached a high degree of development though the sewage in most cases is discharged without treatment. One full-size activated sludge plant is almost completed at Nagoya and the process is being tried on an experimental scale at other places. —H. E. Babbitt, *Eng. News-Rec.*, 104, 1920. From papers of Water Pollution Research Board, England.

Flat Clarification Tanks with Sludge Scrapers—Flat settling tanks with mechanical arrangements for frequent removal of sludge during operation are being generally installed in Germany. Three forms of scraper are described: (1) a continuous chain scraper used in a narrow rectangular tank to push the sludge against the sewage stream to a sludge reservoir at the inlet end; (2) a scraper carried on a travelling bridge, also used in a narrow tank to push the sludge to the inlet end; (3) rotary scrapers for large tanks either square or circular, moving the sludge to a central collecting tank. For this purpose circular tanks with central inlets are most efficient and economical.

Rectangular tanks necessitate a complicated construction of scraper to reach the corners. Central inlets have the advantages of slower average flow for the same retention time and settling of the heaviest sludge near the sludge chamber. Even distribution of incoming sewage is of great importance. This can be achieved by surrounding the inlet with a circular screen of triangular wooden laths with their apexes outwards.

A detailed illustrated description is given of a circular clarification tank, 30 m. in diameter, with a rotary sludge scraper, at Essen-Nord, which treats sewage containing at times very large quantities of light watery sludge, due to iron pickling and chemical wastes. The sewage enters through a wooden lath screen and heavy solids are at once deposited in the sludge tank, lighter matter being carried over to the clarification tank proper.

Owing to the danger of earth movements due to mining, the sludge scraper is carried on floating pontoon bridges and the junctions of the actual scraping parts are all flexible so that they can accommodate themselves to unevennesses in the tank floor. Scum is moved by hand into a channel carried by the scraper floats, and deposited in the sludge collecting tank. The sludge at the bottom of the collecting tank is

forced up pipes by the pressure of the water and deposited in a tank above the collecting tanks. By this means a sludge with a water content of 88–90 per cent is obtained.

Plans are described for a larger tank of this type, 45 m. in diameter. As a single sludge scraper of this length would have too slow a movement in the center, the tank is to be divided into an inner and an outer circle, and the small quantity of light sludge deposited in the outer circle will be moved, by a separate scraper running on rails, to sludge tanks under this outer tank, from which it will flow to the central collecting tank. This will also have the advantage that any sludge stirred up by a too rapid movement of the inner scraper will settle and be removed in the outer circle.—M. Pruss, *Gesund. Ing.*, 53, 1930. From papers of Water Pollution Research Board, England.

Chlorinated Drinking Water: The Use of Activated Charcoal Filters—The only drawback in connection with the chlorination of water is that of taste production. In the presence of the most minute traces of phenols, chlorine produces an objectionable taste and odor in the water.

The simplest control, elimination of the phenols, is practically impossible due to their varied sources. Furthermore, due to this variation it is impossible to control them from the sewage treatment side. The logical control is at the water purification plant. The process giving the best results, thus far, is filtration of the water through activated charcoal.

An experimental plant of 25,000 cu. m. daily capacity was installed by the Ruhrverband. This plant has been in use for several months and has given good results in removal of chlorophenol tastes as well as tastes caused by algae and mineral constituents. This experimental charcoal filter is described in detail.—Karl Imhoff and F. Sierp, *Surveyor*, 76, 1963: 225 (Sept. 6), 1929. From *Pub. Health Eng. Abstr.*, Mar. 29, 1930. Abstr. F. E. DeMartini.

The New Refuse Disposal Plant, Chapman Street—At the new 120 ton refuse disposal plant which replaces the old destructor, everything of value is salvaged and only valueless refuse burned. The refuse is tipped from the collecting vehicles into a hopper and is carried by a continuous plate conveyor to an elevator which lifts it to the long rotary screen. This has a 12 ft. section with 5/16 inch perforations which pass small particles, and 6 ft. of 1½ inch holes through which fall principally cinders. The brass extension to the screen has electro-magnetic coils on one side which separate out the tin cans, which are then chuted to the baling press.

The remainder of the refuse is conveyed on a rubber belt to the firing floor of the incinerator, and paper, glass, bones, etc., are hand picked off the belt. The tailings are burned in a specially designed incinerator to heat steam boilers which drive dynamos that generate the current for the plant and an excess which is sold.

The plant also includes a paper baling press, a clinker crusher, and a mortar mill.—Anon., *Health News*, Hull Corporation, England, 2, 12: 1–2 (Sept.), 1929. From *Pub. Health Service Eng. Abstr.*, Mar. 1, 1930. Abstr. A. W. Fuchs.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., AND LEONARD GREENBURG, PH. D.

Pocket Reference of Information on Occupations—This little booklet, prepared by the U. S. Bureau of the Census chiefly for undertakers and registrars of vital statistics, explains the new requirements which relate to occupations and the census of occupations made in 1930.

The new death certificate which has been introduced in the past year or so is to be the one used from 1930 on, in the entire death registration area, which now composes 95.8 per cent of the population of the United States. The headings which refer specifically to occupations are as follows:

> Trade, profession or particular kind of work done, as spinner, lawyer, bookkeeper, etc.
>
> Industry or business in which work was done, as silk mill, saw mill, bank, etc.
>
> Date (month and year) deceased last worked at this occupation. Total time in years spent in this occupation.

A study of death rates by occupation, such as that planned in connection with the 1930 census, would not be limited to those deaths directly traceable to occupational activities; it would go considerably further, and be perhaps comparable to the report to the British Registrar-General, issued for England and Wales. It is realized that adequate reports on occupations will influence insurance rates, workmen's compensation laws, industrial hygiene activities, and the changes brought about in industry by employers, while it would, of course, make it possible to compare the death rate of workers by occupations and by localities.

While the undertaker is responsible for filling out the blank originally, the local registrar is to review the occupational returns and refer them back where not completed or where the facts are known to be otherwise than stated.

The pamphlet contains a list of instructions to enumerators who took the 1930 census in reference to the questions above, which will be of assistance to those who fill out the death certificates. There is an extensive list of undesirable terms which are to be avoided, and the reasons therefor.

In preparation of the booklet, the valuable services of the National Tuberculosis Association were used, while the revised standard certificate of death was approved at the meeting of the A. P. H. A. in Chicago, October, 1928, and by the conference of State and Provincial Health Authorities, in Washington, in June, 1929.—E. R. H.

Anthracosis—This disease is differentiated from emphysema by the absence of a deformed thorax and alteration of the general condition. Gray sputum is more common than black sputum usually mentioned. Physical signs do not indicate pulmonary induration.

The radiologic signs indispensable for a diagnosis are bilateral lesions at the base and around the hilus, disseminated and nodular at first, but later confluent and encircled by an area of emphysema.

Silica is not a common substance found in coal mines, yet sclerosis among miners is frequent. Nor are bronchitis and emphysema essential factors of sclerosis.—Belgium Letter, *J. A. M. A.*, 95, 10: 741 (Sept. 6), 1930.—E. R. H.

Asbestosis Bodies in Sputum and Lung—While the asbestos industry is more than 2,000 years old, it is only

within the past few years that it has assumed the prominent place which it now occupies in the industrial arts. Until recently asbestosis has been assumed to be essentially silicosis, and the free silica thought to constitute the dangerous factor. (A brief review of bibliography on the subject is made, beginning with the article in 1924 by W. E. Cooke in the *British Medical Journal*, July, 1926.)

In October, 1929, the present authors autopsied a negro patient, dead of a gun shot wound, who had worked for 28 months during a period of about 3 years in an asbestos mill (Charleston, S. C.). Microscopic examination of lung tissues, peculiar bodies were found in sections from both lungs, which are considered characteristic (two illustrations accompany). At about the same time another autopsy was performed on a negro who also died of lobar pneumonia and who had been working in an asbestos mill for 4½ years. Again the "asbestosis" bodies were found on microscopic examination of the lung sections. Following this, search was made for the bodies in the sputum of asbestos workers, where they were readily found in wet slide preparations and in large numbers in a sodium hydroxide digest concentrate.

Examination of a man who had worked 14 years in an asbestos factory, but not since 1926, failed to reveal the bodies. It was found the bodies do not take the ordinary tissue and sputum dyes but may be found in their natural form in slide preparations already stained for the tubercle bacilli. An unexplained iron content of the bodies was also brought out by certain stains.—K. M. Lynch and W. A. Smith, *J. A. M. A.*, 95, 9: 659–661 (Aug. 30), 1930.—E. R. H.

The **Occurrence of Pulmonary Fibrosis and Other Pulmonary Affections in Asbestos Workers**—This very interesting contribution presents the results of a study of the health hazard among asbestos workers. In addition to the presentation of clinical data and X-ray pictures the morbid anatomy of the disease and dust findings in the industry are clearly set forth.

It is pointed out that asbestosis differs from ordinary silicosis both in the gross morbid pathology and X-ray examination. For this reason it is correctly argued that X-ray pictures of the chest of asbestos workers must not be interpreted in terms of the X-ray picture of the worker in other dusty trades.

As in the case of other dusts the end result varies directly as the length of employment and the dust concentration. With high concentrations the disease may be developed in from 7 to 9 years and may cause death in 13 years. The author concludes that further investigation is required in order to decide whether or not there is any increased susceptibility to pulmonary tuberculosis due to the inhalation of asbestos dust or the presence of asbestos fibrosis.—E. R. A. Merewether, *J. Indus. Hyg.*, 12: 198–222, 239–257 (May and June), 1930.—L. G.

Health Service Policies—This is *Health Practices Pamphlet No. 12*, published by National Safety Council, 20 N. Wacker Drive, Chicago, Ill., and includes a study of prevailing practices based upon answers received from 191 clients, companies and their physicians. The personnel of the various plants is analyzed by groups and the types of service rendered—preventive, curative, and related activities—are classified. A composite picture gives the average features respecting industrial medical services in these plants (20 items, too long to enumerate in this place).

It was found that only 5.3 per cent of 3,580 selected industrials reported on some form of medical and health supervision of their employees. Thus, approximately 3,406,000 employees were

not reported upon as compared with 1,615,193 who were, as having health service provisions.

The minimum requirements for a health service are summarized as follows:

1. Pre-employment physical examinations
2. Treatment for minor illnesses
3. The service of a part-time physician
4. The service of a full-time dispensary nurse

The maximum requirements compose a discussion of 13 items, given in some detail.—E. R. H.

Studies in Illumination. III—A Study of the Loss of Light Due to Smoke on Manhattan Island, New York City, During the Year 1927, Especially in Its Relation to the Nature of the Weather, the Relative Humidity of the Air, and the Velocity and Direction of the Wind.

For this purpose, records were made on the roof of the U. S. Marine Hospital, at the lower end of Manhattan Island, where the air was unusually smoky, and on the roof of the U. S. Quarantine Station on Hoffman Island, about 9 miles distant in lower New York Bay, where the air was comparatively clear.

Determinations were made with a photo-electric cell connected to a recording potentiometer. The photo-electric cell had been previously calibrated with a Macbeth illuminometer. It was only necessary to multiply the reading of the tracing stylus by 177 to obtain results in approximate foot-candles. In general, agreement was found with Kimball's contention that illumination is approximately proportional to the total radiation. The records were made during the year 1927, over a period of 286 days.

The highest average daily illumination at Hoffman Island occurred in June and the lowest in December. The greatest total loss of light on lower Manhattan was in July and the least loss was in December. There was a large relative loss of light due to smoke—in some cases greater than 50 per cent.

The average percentage loss of light for the whole year was 16.6 for clear days, 34.6 for cloudy days, and 21.5 for all days. The percentage loss on cloudy days was about twice as great as on clear days.

The average percentage loss throughout the year was 30.2 at 8:30 a.m., 16.5 at 1:30 p.m., and 21.0 at 3:30 p.m.

The average monthly percentage losses showed no marked seasonal effect but did show a marked relation to the average monthly relative humidities, the percentage losses usually increasing and decreasing with the relative humidities.

Other conditions being the same, the percentage loss of light was found to decrease as the velocity of the wind increased.—James E. Ives, *Pub. Health Bull. No. 197,* 40 pp., 1930.—E. R. H.

Occupation and Health—The brochures which have been received under this heading from Nos. 206–212, inclusive, are as follows:

No. 206, Flour Mills
207, Garages
208, Industrial Health (Propaganda)
209, House Porters
210, Industrial Lighting
211, Industrial Physiology
212, Jute

As stated in the September issue, brochures in this *Encyclopedia of Hygiene, Pathology and Social Welfare, Studied from the Point of View of Labour, Industry, and Trades* are said to be now completed through the letter "E" (Brochure No. 199). The price of the complete Brochure Edition is $16.00 and may be purchased through the Book Service, American Public Health Association. The work is prepared by special committees under the auspices of the International Labour Office, Geneva, Switzerland.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

The Williams-Waterman Vitamin B_3—This experiment was undertaken to supply information on the vitamin B_3 factor descried by Williams and Waterman in the case of pigeons in contradistinction to the vitamin B_3 factor reported by Reader in the case of rats. The relative potency in certain foods in the vitamin B_3 factor was determined by feeding adult pigeons a synthetic diet adequate except for vitamin B complex, until symptoms of polyneuritis appeared, when an adequate amount of the vitamin B_1 factor was added.

The food to be tested was supplied and effect on growth and weight noted. These tables show beef liver and lean beef to be superior in the B_3 factor to milk, fruit and vegetable juices. Where the food was also deficient in B_1 weight restoration did not take place, showing this factor as well as B_3 to be essential in this respect. Vitamin B_3 factor in yeast is reduced markedly with alkaline treatment and in malt extract by heat.

Autoclaved yeast had no effect on weight restoration, showing this also not a property of B_2. The authors have been unable to show the need for vitamin B_3 in rats but an experiment with Rhode Island Red chicks indicated in these birds that B_3 is an essential for growth. In this experiment autoclaved feed, with B_1 and B_2 supplements, did not restore growth although protecting from polyneuritis.—Walter H. Eddy, Samuel Gurin, and John Keresztesy, *J. Biol. Chem.*, 87: 729 (July), 1930.

Vitamin G in Certain Meats and Meat By-Products—Vitamin G (B_2) is reported as occurring in varying amount in beef and beef liver and the authors have previously found in commercial beef extract a good source of this vitamin. In this experiment rats were fed a ration containing corn extract for the vitamin B_1 but lacking G (or B_2) until growth ceased, when the meat and meat by-products were added. These were trimmed free from fat and connecting tissue and dried at 60° C. with forced draft and where fat was present extracted with ether.

Supplementary material included beef (round steak), pork tenderloin, smoked ham, lamb, beef liver, pork liver, beef kidney, and beef spleen. Twenty-five per cent of the basal ration in beef furnished sufficient vitamin G for good growth. Pork tenderloin and smoked ham compared favorably with beef; 15 per cent of the former and 20 per cent of the latter resulted in excellent growth. Fifteen per cent of lamb was adequate for good growth. Fifteen per cent of spleen supplied sufficient vitamin G for good growth.

Both beef and pork liver and beef kidney are much richer in vitamin G than lean meat. Good to excellent growth resulted from 1.38 to 3.05 per cent additions of these products. All comparisons were made on the basis of air-dried fat-free material.—Ralph Hoagland and George G. Snider, *J. Agri. Res.*, 41: 205 (Aug. 1), 1930.

A Method of Purification of Carotene and the Vitamin Activity of Purified Carotene—Many recent investigations in the literature on the activity of carotene prepared from leaves or carrots indicate that the substance was not especially purified although Drummond has claimed that purified

carotene, melting point 185°, possesses no vitamin activity, contrary to the views of von Euler and Karrer.

Attempts were made to purify carotene without altering its physiological properties and assuring a separation from the impurities which accompany this presumably inactive carotene. Carotene was prepared by solution in carbon disulfide, crystallization in boiling methanol in an atmosphere of nitrogen. There was obtained crystallized carotene from carrots, melting point 170° to 173°, and showing biological activity on rats in daily doses of 0.03 mg. Five additional purifications resulted in a product, melting point 184° to 185°, which the authors regard as a very high degree of purification.

This product was found active as to vitamin A; a dose of 0.06 mg. per day stopped the loss of weight, cured xerophthalmia, and resulted in increased growth, a daily gain of about 1 gm.; 0.045 mg. gave approximate results; 0.03 mg. stopped the loss in weight and cured xerophthalmia but the resumption of growth in the animals was not uniform. Some of them merely maintained their weight. This product, which is found to be physiologically active, had the same melting point as that reported by Drummond for carotene as inactive.—M. Javillier and L. Emerique, *Compt. rend. Acad. d. sc.*, 191: 226 (July 28), 1930.

Bacterial Spoilage of a Thousand Island Dressing—The spoiled dressing which was studied was composed of a mayonnaise base made from corn oil, vinegar, egg yolk, sugar, paprika, mustard and pepper to which were added pickles, olives, and chili sauce. The pH of the product was between 4.2 and 4.4.

The spoiled material was darker in color and showed separation of oil in varying degree. Spoilage was found to be due to growth in the dressing of a pure culture of an organism closely resembling *B. vulgatus* (Trevisan).

After examination of the chili sauce and egg material used showed that these ingredients were not the source of the contamination, attention was given to the salt, sugar, vinegar, mustard, pepper and paprika. Organisms identical with that causing the spoilage of the dressing were isolated from the pepper and paprika. The mustard also contained a closely related species of spore forming organism. The other ingredients contained no bacteria similar to *B. vulgatus*. It is suggested that this type of spoilage may be prevented by: (a) preparing a product of such acidity that it will not allow the growth of organisms, or (b) sterilization of the ingredient which contains the contaminating organism.—Carl S. Pederson, *J. Bact.*, 20: 99 (Aug.), 1930.

Nutritional Potency of Fresh, Cooked, Dry and Alcohol-Extracted Liver—The literature has emphasized the importance from a nutritional standpoint of calf and cod livers; so experiments were undertaken to determine the nutritional value of other livers and whether this value would be retained on drying, so as to make a prospect for an available supply over long periods in view of the increasing cost of calf liver.

Livers were obtained from calf, steer, lamb, pig, hog, colt, horse, chicken, rat and cod; they were comminuted and dried at 100° C. and the dry material ground in a mill and placed in air-tight containers.

A synthetic diet was prepared essential in nutrients and mineral salts but lacking in the accessory vitamin factors. Rats lost 1 gm. per day on this synthetic ration and after 17 days supplements of the dried liver were fed for 10 days. The supplement was 4 gm., equivalent to 16 gm. of fresh liver. Rats on the synthetic ration alone and on this supplemented by raw beef liver served as controls. Growth curves show that in no case did dried liver addition result

in gains over the synthetic diet alone.

When the supplement was changed to raw liver and cooked liver rapid gain was made. Less rapid gains were made with alcohol extracted raw liver, showing that some accessory is lost in the extraction. Supplements of raw tomato and potato resulted in fair gains but no gain when these vegetables were cooked. Analyses of the livers of different animals show a number of variations. Copper in the calf, lamb and steer livers is approximately 10 times that in the hog, pig, horse, chicken, rat and cod. Iron in the colt, horse, pig and hog livers is approximately 3 times that in other domestic animals. The chicken liver has 4 times the amount of fat of any other liver. Apparently, calf, lamb, steer and chicken livers are on a par as to mineral and nitrogen and on this basis similar nutritional values might be expected to compare with calf liver.

This experiment indicates conclusively the loss of valuable accessories on heating and drying in air at 100° C.—J. S. McHargue, W. R. Roy, and F. E. Hull, *J. Nutrition,* 3: 49 (July), 1930.

Vitamins in Canned Foods. IX. Tomato Products—Various tomato products were fed to rats and guinea pigs to determine their potency in vitamins A, B, and C. The canned products used were whole tomatoes, cyclone juice heated to 140° F. under vacuum, similar juice concentrated to a pulp condition and further concentrated to paste, cyclone juice to which Celite was added and then filtered free of unsoluble pulp, plain cyclone juice held 1½ hours before canning, similar juice evaporated for 45 minutes in wooden tubs, cold tomato juice obtained during the peeling process and juice obtained after steaming the tomatoes.

If the various products are fed on equivalent solid levels their vitamin A potency is approximately similar with the exception of the cyclone juice to which Celite was added and which was then filtered. The vitamin A is removed with the pulp by filtering. The vitamin B content of tomatoes is somewhat affected by certain processes wherein excessive exposure to oxygen occurs. Filtering with Celite reduced the vitamin B potency of the tomato juice by about two-thirds. Vitamin C in tomatoes is apparently quite stable to heat if oxidation is avoided.

In none of the products studied was the vitamin C conserved as in the regularly sound whole tomatoes. In concentrated products such as pulp and paste there was some loss of vitamin C. This was not due to concentration but was brought about before evaporation due to oxidation because of air entrapped in the juice during its passage through the cyclone. Concentration under vacuum corrects this condition and prevents further loss.

Rapidly heating cyclone juice to boiling and concentrating to two-hfths of its volume in an open kettle by boiling for 45 minutes does not permit the entrapped air to exert a destruction of half the vitamin C. Damaging air will not be beaten into tomato juice if cycloning is done while the juice is hot.

Data are given to show how steam may be employed to avoid contact with air in a manner which may have wide application in the handling of foods.—E. F. Kohman, W. H. Eddy, and C. Zall, *J. Ind. & Eng. Chem.,* 22: 1015 (Sept.), 1930.

PUBLIC HEALTH NURSING

EVA F. MACDOUGALL, R. N.*

Well Guided Experience Is One of the Prime Requisites for Progress in the Public Health Nursing Profession—Probably every public health nursing executive, and certainly every state director of public health nursing, finds that she is now and then consulted by a staff nurse or a nurse out in the field as to how she can rise a step higher in her profession. Some of these nurses consulting her have stayed in one position for years, perhaps with a little increase in salary each year, or they have shifted from one school nursing or one county nursing position to another. They feel that that they ought to grow, to advance, to take added responsibility. We need many of these nurses who are content to stay on and do the great bulk of public health nursing; yet there are others who are unhappy and not doing their best work standing on a level year after year. They are ambitious and usually have vision and executive ability; our leaders in public health nursing must be recruited from these.

What advice do we give them? If they want to be the executive directors of public health nursing associations, no better advice can be given than that embodied in *The Board Members' Manual:*

> The generally accepted standard for large associations is that she should be a high school graduate, a registered nurse graduated from an accredited school of nursing, preferably have had postgraduate work in public health nursing at some accredited college, experience as staff member of a public health nursing organization giving adequate supervision, experience as a supervisor, and, when possible, as an assistant executive director. She should have sound administrative ability to organize and direct the work.

That nurse is lucky who during her nursing training had two or three months' field work with a good public health nursing organization, for this extra experience, though only giving her an inkling of what public health nursing is, enables her more easily to get a staff position with the organization after finishing training, provided her record is good and her personality suitable. Then after she has completed one, two, or three years of staff work, what if she wishes to go into another phase of public health nursing? The next step is to take one of the accredited university courses in public health nursing for 4 months—or better, 8 months. This will broaden her outlook on all phases of public health nursing, and she is then able to take a public health nursing position alone. If she makes good in a position by herself with her staff training and theoretical course behind her, she is in line for a position of greater responsibility, and can then begin to climb.

But what of the nurse who, after finishing nursing school, went directly into a public health position where she worked alone without training or supervised experience? If she finds she has advanced as far as she can, the only thing for her to do is either to get a position on a good public health nursing staff which has a good staff education program or take a university public health nursing course, and it is better to do both if her goal is to be an executive in a generalized, or even a specialized, public health nursing program.

For instance, a nurse who had been

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* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 126 State House Annex, Indianapolis, Ind.

doing school nursing by herself in a small town 6 years, with courses in university during 3 summers, is now on a well organized visiting nurse association staff where her promotion will undoubtedly be rapid. Another, a staff nurse for a good public health nursing association for 6 years, and wishing to get a county nursing position, will take a 4 months' university course before she is recommended for a county position.

But what of the great number of nurses who are just out of training school or who have been doing private duty and who never had any public health nursing during training or after? Since some of the university courses only accept students who have had some public health nursing training, they are cut off there. Their only hope is to get a staff position first and then take their university course; and there are not staff positions enough to go around. But for these nurses to go out and take public health nursing positions, even if organizations would employ them, is an injustice to themselves and to the communities.

It would seem that in order to train public health nurses better there needs to be more staff positions open to them. And this would be possible if more official agencies would employ real public health nurses as their supervisors or executive directors, so there could be a staff education program. The nurses on some official staffs are getting unguided experience. A physician or health officer cannot train nurses in their work; otherwise, why are physicians not superintendents and supervisors of nursing schools? There are some official agencies in the country, both city and county, which do employ well trained nurses as their directors, and they are accomplishing the outstanding work that is being done.

But what if a nurse has had all the experience and training that are necessary to direct a public health nursing staff, either small or large, and she does not advance or get anything like the kind of position she wants? Then she had better study herself and see if her personality stands in her way—for as Malinde I. Havey, R.N., of the American Red Cross said after a study of nursing qualifications for rural nursing, "A course will do without experience; good experience will do without a course. But of the three things, theory, practice, personality, the greatest of these is personality."

New School of Nursing at Vanderbilt University—The School of Nursing at Vanderbilt University at Nashville, Tenn., has been organized as an independent school of university rank through the financial support of the Rockefeller Foundation. The school will offer not only programs of study to undergraduate students, but to graduate nurses as well.

Shirley C. Titus is Professor of Nursing Education and Dean of the School of Nursing at Vanderbilt University. Miss Titus is well known in the nursing field of this country. She holds a B.S. from Teachers College, Columbia University, and an M.A. from the University of Michigan.

Beginning September, 1930, courses will be offered to graduate nurses in public health nursing. The public health nurse may matriculate for a 4-year course leading to a B.S. degree; she may register for the 9 months' course, the satisfactory completion of which entitles her to a certificate in public health nursing; or she may take the 6 weeks' extension course which will be offered each summer (on or about June 12).

Mary J. Dunn is Professor of Public Health Nursing in this new school and will organize and direct the courses in public health nursing. Miss Dunn holds a B.S. from Teachers' College, Columbia University, and has had a varied experience as assistant consultant in

maternity, infancy and child hygiene with the New York State Department of Health—later with Cornell University as instructor in child care and training. For the past two years she has been educational director of the Bureau of Nursing, New York City Department of Health, and part-time instructor at Columbia University.

With its own dean, faculty and budget the Vanderbilt School of Nursing represents one of the most complete teaching centers for nursing education in the United States.—From announcement sent by Vanderbilt University to the A. P. H. A.

The Nurse the Doctor Wants— The ideal nurse for the present-day physician is one who has good breeding and an attractive personality, skill in giving general care and making patients comfortable, who can observe and report symptoms well, takes care to follow medical orders and is adept at handling people.

This picture of the perfect nurse was ascertained from questionnaires sent to doctors in many branches of medicine, by the Committee on the Grading of Nursing Schools, which is conducting a 5-year study of nursing and its problems. The above qualifications were the five most stressed by the more than 4,000 physicians from all parts of the country who answered the queries.

Just how the various requirements for a good nurse rank in the minds of the physicians as a whole may be seen from the following:

Requirements	Per cent
Skill in general care	65
Skill in making the patient comfortable	65
Skill in observing and reporting symptoms	45
Care in following medical orders	43
Good breeding and attractive personality	34
Skill in handling people	30
Skill in asepsis	28
Familiarity with hospital routine	27
Experience and background	22
Familiarity with their personal methods	21
Ability to work under a heavy strain	15
Familiarity with a particular disease	15
Responsible adult to take charge of the family	3
Mother's helper and houseworker	3

The modern physician thus places the old-fashioned concept of a nurse as "a pair of hands and feet" at the bottom of the list. His demand now is for a woman of good background, of high professional principles, with thorough training and experience in the actual care of the patient, as nurse for his cases.

The study shows that the demand for practical nurses by physicians is steadily dropping, with 84 per cent preferring the graduate, registered, trained nurse at all times for their own cases, and an additional 8 per cent preferring them always for certain types of cases.

The general practitioner and the internist are most interested in the ability of the nurse to give general care, 69 per cent and 70 per cent. respectively, registering for this quality as compared with the average percentage of 65. The neurologist is least interested in it, though more than half of those questioned checked for it.

Skill in observing symptoms is most desired from the nurse by the surgeon, neurologist, obstetrician and pediatrician. The three last-named groups also had a more than average interest in the qualification of good breeding and personality. The surgeons emphasized skill in asepsis and care in following medical orders as well.

The neurologists are by far the most interested in having for their patients nurses who can handle people, 61 per cent checking this, as compared with an average of 30 per cent.

Nurses who take particular care to follow orders shine brightest in the eyes of the pediatricians, 57 per cent of them desiring this qualification, while the average demand is 43 per cent. The surgeons and the obstetricians are most interested in having nurses familiar with

hospital routine and their personal methods.

Nine out of 10 physicians reported they are getting the nurses they want and would be glad to take the nurse on their last case back again. The surgeons were the group most satisfied, 63 per cent of them marking their nurses with the highest rating.

Some of the typical comments made by the physicians, that show what they appreciate in nursing care specifically, were:

A good observer, gentle, thorough. She follows orders explicitly and reports changes promptly.

My nurse has a sense of humor, which helps a lot.

She kept hordes of anxious relatives and friends out of the room.

She has always been cheerful.

She combined a good technical training with common sense.

She carried out orders but modified them when the need was obvious.

She had a proper sense of the dignity of the position.

She is intelligent, observing, not afraid to take a severe case twelve miles in the country.

She was a good cook and knew how to handle people.

There has been a very distinct improvement in the patient's mental condition during her stay in the hospital.

Her asepsis was perfect.

She was of great value in preventing a psychosis from developing.

One of the nurses was exceptionally good-natured and tolerant.

Anyone who can feed a patient a half-pound of cooked liver daily for 4 or 5 months deserves credit for being a good cook and knowing how to handle people.

She sees to it that even the family are happy.—

Nurses, Patients and Pocket-books, 1928, p. 121; Nurses: Production, Education, Distribution, and Pay, May, 1930, 36 pp. Bull. Committee on the Grading of Nursing Schools, 370 Seventh Avenue, New York, N. Y.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

We Are Being Studied and Written Up—1930 will be notable for special recognition of health education by research workers and writers of reference works. An extensive study of health education in a large city has been published. A book manuscript reporting on health education through a period of years in a city is under consideration. Health education, both popular and in the schools, will be reviewed in the *Social Work Year Book* about to be issued by the Russell Sage Foundation. An encyclopedia article on popular health education is in manuscript form.

A study of education in mental hygiene has just been completed. Another study in the mental hygiene field has been announced. A careful review of social hygiene educational material recently made has been utilized in the planning of several experimental campaigns. A university thesis has been based upon an examination of public health in newspapers. A study of health education results in a county has included an examination of the newspapers upon which a university thesis will be built. The city health surveys have included small chapters on health education. And of course 1930 has seen much and varied study and formal discussion of the teaching of health in schools and colleges.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

We Thank the Guest Editor—If in the fall rush you missed this department in the September and October issues of the JOURNAL, look them up and you will know why we thank Dr. H. E. Kleinschmidt of the National Tuberculosis Association.

Syndicated Health Information—The "Annual Directory of Features" shows that "health advice columns were never more abundant." Twenty columns are listed by *Editor and Publisher* (Times Bldg., New York Aug. 30, 1930), the authors including Drs. Morris Fishbein, G. Logan Clendenning, William Brady, George C. Tallerday, Sophia Brunson, Royal S. Copeland, W. A. Evans, Iago Galdston, Frank McCoy, Joseph Jastrow, James W. Barton, John Joseph Gaines, Clarence W. Lieb, Leland B. Alford, and G. Leroy Dale. In contrast it is interesting to note that 109 sport page features are distributed. The directory includes lists of writers and artists, feature and picture syndicates, news, photographic, mat and art services.

"Unfortunate Advertising"—A warning from a professional journal seems to set a standard for all publications of all types in the public health field—and for the more or less educational printed matter from commercial sources so frequently distributed by health agencies:

> Complaints are beginning to be heard regarding the advertising policy of some of our professional journals. There is a growing feeling that some of the advertising is detrimental to the best interests of the profession, and serves to hinder the proper development of . . . by placing around unworthy and unscientific preparations an aura of respectability that they by no means deserve. Forward-looking practitioners appreciate that honest and well directed advertising is a valuable means of informing the profession of products worthy of their attention. But they also are aware that intrinsically dishonest advertising, either by advertising scientifically worthless preparations or by misstatement of fact, is a perversion of editorial license, and a disgrace to any profession which tolerates it.
>
> There is enough information available, both scientific and regulatory, to make possible an honest and judicious selection of products for advertisement and the statements contained therein. The situation might be excused if there were no such information but since the publication of the exposes from the . . . conscientious practitioners may well question the motives and policies of those who carry such advertising. . . . In the long run, if any journal expects the support of the profession, it must prove its good faith by accepting only advertising that is honest.

DIPHTHERIA

A good 4-page folder to follow up a diphtheria campaign—Westchester Tuberculosis and Public Health Association, 8 Church Street, White Plains, N. Y. *2 cents.*

The Board of Health, Racine, Wis., supplies a blue button with white letters reading: "I am Schicked—Are You?" *Sample, 5 cents.*

Buffalo department stores are using a 2-page leaflet, reproduced in *Health News,* State Department of Health, Albany, N. Y. June 23, 1930. *Free.*

"The Battle Against Diphtheria—News from the Front Line Trenches." *Public Health Nurse.* June, 1930. Reports from Bakersfield, Detroit, and elsewhere.

HONORABLE MENTION

To State of Ohio Department of Education: for bibliography in Health Education in Health and Physical Education Series—for dating most of the titles listed; names of publishers (and addresses of some of them); and prices of most pamphlets listed.

To Board of Health, East Orange, N. J.; Department of Health, Montclair, N. J.; Department of Health, Syracuse, N. Y.; Bureau of Public Health, New Mexico: for annual reports, all different, but all good—in the clear grouping of information, use of diagrams, table contents, and index (in two of them).

RADIO

Health broadcast number 370 was released Sept. 15, 1930, by the U. S. Public Health Service.

Mimeographed copies of radio talks by New York City Department of Health are available. *Free.*

Reports of radio addresses over WCCO are reported in the issues of *Everybody's Health,* St. Paul, Minn. *10 cents.*

Mimeographed copies of five radio talks given over WEEI are supplied by Massachusetts Society for Mental Hygiene, 5 Joy St., Boston, Mass. *Free.*

The Connecticut State Department of Health has announced topics for 5-minute talks every Thursday, September through May, over WTAC. List *free.*

Printed copies are available of broadcasts by the National Safety Council, 20 North Wacker Drive, Chicago, Ill. *Free.* Given Friday evenings over 23 associated NBC stations.

Thursday, September 25, 1930, the New York State Department of Health broadcast its radio health talk number 432! Every Thursday from station WGY. The new releases on these radio talks show that nearly always the speakers cut out the opening generalizations and get down to business with the first sentence—due largely to the 5-minute limit.

MOTION PICTURES

For the cost of the negative, a college, school or local amateur movie club will produce a picture portraying health facts, ideas, or activities.

Camp Sanitation, "produced in collaboration with the Indiana State Board of Health," is offered by National Motion Pictures Co., Indianapolis. 1,000 feet.

A one-reel educational motion picture, showing sanitation in camps and rural districts where modern sanitary features are not always obtainable.

New Methods of Malaria Control, "produced in collaboration with the U. S. Public Health Service, and under the supervision of J. A. LePrince and H. A. Johnson," is offered by Universal Cinema Co., Indianapolis, Ind. 1,000 feet. Both 35 mm. and 16 mm. film.

This film is crowded with workable methods so convincingly simple that these can be readily patterned after. Besides this, the appeal of this film is of such human interest and force that the public will rally to the cause and coöperate with the public health officers in their mosquito eradication work.

The 1930–1931 edition of Selected Motion Pictures lists 34 titles under "Safety, Sanitation, First Aid and Health." Pictures supplied free. Motion Picture Bureau, National Council, Y. M. C. A., 120 West 41st St., New York, N. Y. *Free.*

"Films in Teaching Anatomy," by H. W. MacMillan, D.D S. *Movie Makers,* 105 West 40th St., New York, N. Y. Oct., 1930. *25 cents.*

"How Animated Cartoons Are Made," by Quinn Martin. *N. Y. World Magazine.* Sept. 29, 1930.

"Nut Crackers," by D. C. McGiehan. *Movie Makers.* Oct., 1930. "Home made helps for ambitious amateurs." Also, "Let's Make a Title Board!" by I. H. Smith.

"The Movies in Medicine," by Carl D. Clarke. *Hygeia.* Sept., 1930.

DIPHTHERIA

A bull's eye diagram with 64 named dots represents the status of T. A. T. immunization of children under 5 years of age in as many communities in New York State. The idea could be applied to townships in a county or to wards in a city. In *Health News,* New York State Dept. of Health. Aug. 11, 1930.

A house-to-house canvass by nurses to interest parents in having their children immunized is described in *Weekly Health Review,* Dept. of Health, Detroit, Mich. Sept. 6, Sept. 20, 1930.

Governor Larson has been asked by

the New Jersey Committee for the Prevention of Diphtheria to grant it an honorable discharge. The committee feels that its work has been completed and suggests that further conduct of the campaign against diphtheria be carried on by the medical profession, health departments, and local groups organized by the state committee since it was appointed by Governor Moore three years ago.

EDUCATIONAL MATERIAL

Catalogue of Bureau of Dental Health Education, American Dental Assn., 58 East Washington St., Chicago, Ill. July 15, 1930. All forms of educational material. *Free.* Get copies for local groups interested in mouth hygiene. Thus you may help along with little effort and expense.

"Check List of Red Cross Publications." *Red Cross Courier,* Washington, D. C. Sept 2, 1930. *Free.* Some are useful to other agencies.

Public Health Service Publications. In *Public Health Reports,* Washington, D. C. Aug. 29, 1930. Titles issued 1929–1930—both popular and professional. Supt. of Documents, Washington, D. C. *5 cents.*

Dr. Gerald B. Webb, Colorado Springs, Colo., is writing a pamphlet on "What You Should Know About Tuberculosis" for the National Tuberculosis Association.

The Care of Your Baby, by U. S. Public Health Service. Supt. of Documents, Washington, D. C. 50 pp. *10 cents.*

Milk, by Agriculture Dept., Washington, D. C. 8 pp. *5 cents.* Sanitation in production.

Social Hygiene in Relation to Prevention of Blindness, National Society for the Prevention of Blindness. 370 Seventh Ave., New York, N. Y. 32 pp. *25 cents.* Get copies for editorial writers, and a few key individuals.

Watch Your Step! (feet); Attention! Stand Tall! (posture); Care of the Child in Hot Weather; Supplies Necessary at Time of Confinement; Sensible Sun Baths. Massachusetts Dept. of Health. Samples *free.* Note how effective simple text and illustrations can be, and learn from your printer how antique paper would add but little to the cost with considerable gain in attractiveness.

The Home That is Safe (12 pp.); Helpful Suggestions About Infant Paralysis (4 pp.); Give Your Heart a Chance (12 pp.); What is Rheumatism? (12 pp.). Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. *Free.*

Catalogue of Free Publications. Evaporated Milk Assn., 203 North Wabash Ave., Chicago, Ill. *Free.*

List of Free Publications. California Fruit Growers' Exchange, Los Angeles, Calif. *Free.*

NEW

The Journal of Cancer Research has become *The American Journal of Cancer,* 1145 Amsterdam Ave., New York, N. Y., with a broadening of its editorial range.

MAGAZINE ARTICLES

These articles contain much quotable material for writing and speaking. They reveal health teaching which reaches large numbers of readers. Sometimes they will suggest friendly letters of correction to editors.

As a rule we do not list articles in *Hygeia, The Survey,* or in professional magazines which are available to all public health workers.

"Are you a Heliophobe?" *Literary Digest.* Aug. 2, 1930. Page 26.

"Can We Extend the Life Span?" by Louis I. Dublin. *Harpers.* May, 1930. Page 766.

"Don't Blame the Stork," by Ruth F. Wadsworth, M.D. *Colliers.* Aug. 23, 1930. Sex-determination.

"Fewer Die; Fewer Born." *Literary Digest*. July 19, 1930. Page 12.

"Infantile Paralysis," by George Draper, M.D. *Harpers*. Feb., 1930.

"Let Your Doctor Do It!" by Logan Clendenning, M.D. *Colliers*. Aug 2, 1930. The "specialist" in "general practice."

"New Wasp to Fight Mosquitoes." *Literary Digest*. July 19, 1930. Page 27.

"Rat Pie," by C. C. Van Blarcom. *Harpers*. Feb., 1930.

"Some Classic Allusions to Milk," by James A. Tobey, Dr.P.H. *Trained Nurse*. Sept., 1930.

"The Acid Test," by Fassett Edwards, M.D. *Colliers*. July 19, 1930. To be "acid" or not to be.

"The Job and the Life Span," by Louis I. Dublin. *Harpers*. Jan., 1930.

"Vineland Experiments Aid to Science." *Trenton Sunday Times-Advertiser*. June 29, 1930. Illustrated page; training of mentally handicapped.

"Why Drown?" by Capt. Charles B. Scully. *Saturday Evening Post*. July 12, 1930.

CAMPAIGNS—DAYS

March 1, 1931, is the final date for reports on the 1930 Health Conservation Contest conducted by the Chamber of Commerce of the United States.

A colorful parade was the feature of a preschool celebration of Child Health Day at St. Joseph, Mo., as described and illustrated in *Red Cross Courier*, Washington, D. C., Aug. 1, 1930. *Free*.

Two features of the coming Christmas Seal Campaign will be a playlet by Mrs. Louise Brand of the Wisconsin Anti-Tuberculosis Association, and a Sam Lloyd puzzle contest to be put on by state and local committees.

In the National Negro Health Week the prize for the best observance in a city of more than 100,000 was awarded to Nashville, Tenn., which city won also the prize for the best observance in all communities. Wichita Falls, Tex., won in the class under 100,000 population, and Kent County, Md., reported the best rural observance of the week.

A report on the Early Diagnosis Campaign of the tuberculosis associations shows that 4,531,432 booklets and 907,660 posters and posterettes produced by the National Tuberculosis Association were distributed, in addition to small quantities prepared by some of the state associations.

The coöperation of the newspapers, radio broadcasting stations, magazines, and life insurance companies was superb. While there is no way of checking the total national publicity, it is fair to say that it exceeded that of all previous years. Of the plate matter and special stories sent out, newspaper clippings indicate a wide use.

WHY DO THEY DO IT?

A state health department mimeographed bulletin comes rolled. With some effort one can unroll the darn thing—but it is a sight!

REPORTING

The Organization of a Rural Tuberculosis Service, by Stephen A. Douglass, M.D., is another of the delightfully printed, paper cover reports issued by the Milbank Memorial Fund, New York, N. Y. A distinctive feature of this report is the group of full page photographs without any distracting captions or titles. Curiously enough the addresses of the health staffs of Cattaraugus County are not given.

The solid black cover of the 1928–1929 report of the Henry Street Visiting Nurse Service (99 Park Ave., New York, N. Y.) is broken by a cut-out in the center which corresponds to the silhouette of a nurse in the center of the title page. About 5½" × 8"; the Kabel Bold black-face type is striking for limited use; silhouettes on the 13 pages of text; 11 pages of easy-to-read financial statement, and management committees *with all names in caps and*

lower-case. The page "About Bequests" is unusually well done.

Says Maternity Center Association, 578 Madison Ave., New York, to its supporters:

> As we are spending every available dollar on giving care to mothers in these hard times of unemployment, we are sending you this brief (and very inexpensive) account of our work for the year 1929 in lieu of our usual Annual Report.

The report is 5¼" × 4", 12 pages, and accompanied by a large sheet listing names of contributors. *Free.*

Statistical Reports of Services, Bellevue-Yorkville Health Demonstration, 325 East 38th St., New York, N. Y. Again they illustrate how neatly and readably mimeographing and other processes can be used in presenting statistical data.

WRITE YOUR OWN HEADING

A way to make plain diagrams more picturesque is illustrated in "Underweight Children in Seattle," by W. W. Davis. *Hygeia.* Oct., 1930, pp. 937–940.

A topographic map of San Francisco is used to show location of playgrounds by the Playground Commmission in its annual report. In contrast, on the opposite page is a street map of the city with its maze of streets and other fine detail. For some uses the topographic map brings a note of novelty and of clarity.

Recently *Editor and Publisher* offered the following "hunch" to newspaper editors:

> How are babies marked for identification in the larger maternity hospitals of your city? How are the first 10 days spent in some of the leading institutions? A local story showing how the new babies arrive in the world in modern hospitals would be particularly timely and interesting.

A blotter appeal for a Henry Street Settlement camp (265 Henry Street, New York, N. Y.) makes an emotional appeal without "sobs." Four line cuts show possibilities on a blotter. In adapting the blotter idea the cut-out flap could be omitted. Make the flap about two-thirds as large as the main blotter section, or merely double it. *Sample 2 cents.*

PLAYS

> Mental hygiene was unusually and interestingly presented through a playlet entitled "My Son John" . . . at the annual convention of the National Congress of Parents and Teachers. The scenario was written by Dr. Lawrence Woolley, . . . and contained six scenes. The story revolved around 9-year-old Johnny whose family was disturbed by his frequent tantrums following an attack of illness and by his failing in school. A neighbor suggested that Johnny's mother seek the assistance of the local child guidance clinic, which she did. The subsequent scenes include the visit of the psychiatric social worker to Johnny's home; the psychiatric examination in the doctor's office; the customary staff conference on the case; and the psychiatrist's treatment interview with Johnny's mother.
>
> . . . The audience was unanimous in expressing enthusiasm for this playlet as an educational medium of great value in getting across to that portion of the public which is uninformed about mental hygiene some of its essential features.

The playlet is being revised before publication by the National Committee for Mental Hygiene.

A Health play in which all the lines are chanted by the "Judge" offers a delightful and effective variation. "A Syncopated Health Trial," by Hazel M. Bowman. *Hygeia.* Oct., 1930, pp. 944–946.

PUBLICITY NEEDED

> The responsibility in Cook County as elsewhere clearly rests in the first instance upon the citizens in whose neighborhoods these new centers of recreation (immoral road houses) are being located and no law enforcing officials, federal, state, or municipal, will be able to regulate or eliminate them without the *interested support of the public.*

—Cook County (*Illinois Roadhouses,* by J. F. Binford). *Journal of Social Hygiene.* May, 1930.

SOCIAL HYGIENE

In "Gaining a Public" (*Journal of Social Hygiene*, May, 1930), Ray H. Everett tells of experiences in the "dark ages" of the social hygiene movement, and describes later developments. The newspaper situation is thus pictured:

> Such writers as Dr. William Evans and Angelo Patri, whose material reaches national audiences through syndication, have rendered great service to the movement. In fact Dr. Evans probably was the pioneer in the use of the straight-forward medical terms, syphilis and gonorrhea, in his press columns. It was a curious anomaly that many newspapers carried venereal disease advertising but refused to mention these words in their news columns. Such advertising is prohibited by law in most states today, but many editors still ban such words as "syphilis," "gonorrhea," "prostitution" and the like, one even going so far as to attribute an address by a noted professor of urology to "a well-known professor of social diseases." There has been a noticeable increase both in liberality and understanding during the past few years, however, and the time may soon come when a great majority of editors will have no more fear of an adequate social hygiene vocabulary than have a constantly increasing number of their readers.

"Innocent Children," in the same magazine, reproduces a brief syndicated article by Angelo Patri which, appearing in a number of newspapers, brought 1,800 requests for social hygiene information.

Another article, "1850–1930," is an interesting historical review prepared for use in social hygiene programs in connection with the celebration of Dr. Welch's 80th birthday.

Under "Exhibits" is an account of the charts and other wall display material prepared for the annual meeting of the American Social Hygiene Association. We hope that the Association will adopt the suggestion that this material be mounted on a revolving or loose leaf displayer where it can be shown to interested people who call at the national office. The type of material and the form of display would then illustrate a valuable idea for state and national health agencies, for reaching professional and volunteer workers who call at such offices in the course of the year. Probably it would be well to provide one or several high chairs to make the experience more comfortable.

HOME-MADE POSTERS

A set of mimeographed health habit posters illustrates what might be done in many provinces and states. The mimeographed copies (on legal size sheets) may be colored, reproduced on the blackboard or on large cards or sheets, reproduced locally by mimeograph for wide distribution, or used to suggest posters to be made up from magazine pictures by the children. *Posters for Health Teaching—How to Make and Use Them* is a 2-page mimeograph memorandum. An example of sound advice:

> If a single word or phrase is to be used, capitals are advisable, but for a sentence, use small letters. Allow space between words and lines.

All of the above from Health Education Service, Manitoba Department of Health and Public Welfare, Winnipeg. *Free.*

But why should not the above and other instructions on poster making include references to additional material available to the teacher, parent, or health worker who might care to get further ideas and help on the subject?

There are several books and several pamphlets on the subject—already mentioned in this department. Write if you wish them mentioned again.

BOOKS AND REPORTS

Tropical Medicine—*By Sir Leonard Rogers and John W. D. Megaw. Philadelphia: Blakiston's,* 1930. 536 pp. Price, $5.00.

Within the year we have had three notable books on tropical medicine, the classical works of Stitt and Manson being revisions. The book before us will unquestionably take a high place in such literature, giving, as it does, the experiences of two well known men as the result of years of experience in both clinical and pathological work in India. They hold that the existing books on tropical medicine are better fitted for readers who are trying to qualify for diplomas than practising physicians.

They have departed from the cut and dried method of arrangement, and have classified diseases in accordance with their causal agencies, believing that it is more suitable to discuss amebic dysentery, for example, as an intestinal infection than with other protozoal diseases like malaria. Following this plan, tropical diseases are grouped in 11 sections, with such headings as: "Febrile Diseases caused by Protozoa," "Febrile Diseases caused by Spirochaetes," etc. This classification has much to commend it. The authors evidently believe in the historical method of teaching, and give considerable space to the history of tropical medicine.

The book is well written and eminently practical, in descriptions of the diseases as well as treatment, though there will doubtless be those who will not agree entirely with some of the statements. It is interesting to note that the authors are not carried away with some of the newer drugs which have been widely exploited, such as plasmoquin in malaria, Bayer 205 in trypanosomiasis, and yatren for amebiasis. There are others who will possibly object to the retention of some of the older terms in classification.

Some of the illustrations are excellent, but others could be improved. On the whole, we consider the book one of the best in its class, and believe that it will fulfil its aim.

While the authors state that they have collaborated closely in the preparation, and each assumes a general responsibility for its contents, they have signed the chapters of which they are the authors, and reserve the right to some differences of opinion, holding that tropical medicine has not yet reached a stage which permits ex cathedra pronouncements or claims to infallibility.

M. P. RAVENEL

Report on Fifth International Congress of Military Medicine and Pharmacy—*By W. S. Bainbridge, Commander M.C.F., U. S. Naval Reserve. Menasha, Wis.: George Banta Publishing Company,* 1929. 154 pp.

The Fifth International Congress of Military Medicine and Pharmacy met in London in May, 1929. This congress is assembled bi-annually, usually in the capital of some one of the participating nations. Its mission is to afford an opportunity for the interchange of ideas, experience and knowledge in all branches of military medicine. The Fifth Congress was composed of delegates from forty nations.

The report as prepared by Commander Bainbridge, a delegate from the United States, is principally a compilation of reports and communications submitted to the Congress on the subjects of Evacuation of Sick and Wounded by

Air and Water: Tropical Fevers of Short Duration; Injuries to the Blood Vessels and their Sequelae; The Physical and Chemical Analysis of the Glass and Rubber Articles employed by the Medical Services, and The Standard of Dental and Physical Fitness in the Various Military Services. These articles are all the result of thorough study by men well acquainted with the subjects under consideration; consequently, they contain much information of value to those interested in military medicine and should prove of interest to all members of the medical profession. The article on the Evacuation of Sick and Wounded by Air and Water is particularly good.

The book contains a number of very interesting illustrations showing sanitary appliances and methods of transporting wounded men. In the preparation and publication of this concise yet comprehensive paper, Commander Bainbridge has performed a valuable service for the medical profession in general and for the military medical services in particular. G. C. DUNHAM

Proceedings of the Twelfth Texas Water Works Short School—*Abilene, Texas, January 27–30, 1929.* 189 pp. Price, $1.00.

This publication is divided into two sections, one on water and the other on sewage. In the first section a number of subjects such as improvements in particular water supply systems, cross-connections and their control and elimination, developments in the treatment of highly polluted water, swimming pools, underground water supplies, water purification by chemicals, and disinfection of drinking water are covered. A particularly interesting paper describing the water works of the City of Mexico by three of the engineers in that service is worthy of attention.

In "Progress in Sewage Disposal," Ehlers gives the status of municipal sanitary improvements in Texas on January 1, 1930. This is complete and valuable for reference. Other subjects touched upon by speakers include the effect of gases on bacteria growth in sewage, lagooning sewage sludge, observations on the treatment of cannery wastes, and the advantage of sludge circulation and vacuum degasification. ARTHUR P. MILLER

The Science of Biology—*By George G. Scott, Ph.D. (rev. ed.) New York: Thomas Crowell Co.,* 1930. 633 pp. Price, $3.75.

Here is a revised edition which the publishers advertise as "practically a new book." However this may be, the arrangement of material and method of presentation are not materially changed. The writing of a textbook on biology in one volume is a stupendous task, and at best can be little more than an outline guide which the instructor fills in as his knowledge permits. Professor Scott presents an inclusive outline filled in with interesting and suggestive details. As to the pedagogical considerations involved one not concerned in this field should express no opinion. The sections on euthenics and eugenics from the standpoint of public health should be carefully read as indicative of what is being taught those who may become leaders in this field. N. W. LARKUM

Stalkers of Pestilence—The Story of Man's Ideas of Infection—*By Wade W. Oliver, M.D. Introduction by Theobald Smith, M.D., Ph.D. New York: Hoeber,* 1930. Price, $3.00.

Medical history has a peculiar fascination. It reveals the twists and turns of the human mind, many leading into darkness, but fortunately most having a general trend toward the light; also the pestilences which took an almost unbelievable toll of life and tried the souls of men. Not only has disease been a powerful factor in directing the growth of civilization, but has determined the

geographical distribution of races, and frequently changed the history of the world. Civilizations have disappeared before the ravages of pestilence, as in Italy and Greece. Vast areas of fertile soil have remained practically uninhabited and uncultivated on account of malaria, as in the southern states of our own country.

The book before us is a reprint with additions and corrections from *The American Journal of Surgery*. It is an outline rather than a history, though it covers an enormous amount of ground. A number of brief sketches of the great physicians of the past, but also some arrant quacks, are given, and there are some names one would not expect to find, like Sir Isaac Newton and Charles Darwin.

The book is well written, well documented, abundantly and well illustrated, and correct as to facts; but we consider the name misleading. The most notable omissions, considering the title, are of those who have stalked pestilences from the administrative standpoint, and one can hardly excuse the failure to maintain Villemin and his epochal studies on tuberculosis.

The book is a contribution to the study of medical history, which received its great impetus in this country from the late Sir William Osler, and can be commended as a handy reference.

M. P. RAVENEL

Common Colds—Causes and Preventive Measures—*By Leonard Hill and Mark Clement. London: William Heinemann,* 1929. 121 pp. Price, $3.00.

While the preface does not so state, it is to be presumed from the arrangement of the subject matter that the book has been prepared for lay reading. The retention of rather obsolete terms such as "choane" and "conchae" strikes the reviewer as unfortunate.

As a whole, the book presents in brief but readable form a symposium on the effects of proper hygiene on the prevention of the common cold. One illustration is rather unhappily chosen in referring to the adaptation of dress to the requirements of climate and occupation by the statement that "women have, in recent years, shown how little is required," inasmuch as the young women in the United States most clearly represented by the above statement are the only ones, as a group, to show an increase instead of a decline in the death rate for pulmonary tuberculosis during the past decade.

The plea for better ventilation, more sunshine, reasonable dress, balanced diet, and adequate exercise as the most adequate measures against the common and infectious cold is, for the most part, clearly and logically presented.

ALBERT G. BOWER

Ninth Annual Report of the Ohio Conference on Water Purification—*Columbus, O.* October 24–25, 1929. 107 pp.

This pamphlet is so full of interesting and instructive material that a review of it can only indicate what it contains. The water purification and softening plants at Fremont and Marysville are described and discussed, and one paper is devoted to the subject of maintaining a chemical balance in purified water so as to eliminate its corrosive tendency.

The troublesome problem of phenol in raw water is touched upon in two papers, one of which discusses removal of phenolic tastes, and the other the control of such tastes by increased lime treatment. Similar to these there are two others, one of which covers the taste and odor problem at Toledo, and the other, which is particularly timely, covers the ammonia chlorine process as a means for preventing tastes and improving sterilization.

Due to the increased importance of swimming pools, two papers are devoted

to them, one on swimming pool sanitation and the other on design.

Several pages are devoted to miscellaneous plant problems.

ARTHUR P. MILLER

Physiology and Biochemistry of Bacteria, Vol. II and Vol. III—*By R. E. Buchanan and Ellis I. Fulmer. Baltimore: Williams and Wilkins,* 1930. Vol. II, 709 pp. Price, $7.50. Vol. III, 575 pp. Price, $7.50.

Volume I of this series appeared in 1928 and was reviewed in this JOURNAL January, 1929, p. 129. All that was said regarding Volume I applies to the other volumes. The authors have now completed the task they set out to accomplish, namely, the collection and evaluation of available information concerning the more fundamental properties of bacteria and the principles governing bacterial action. When one picks up Volume II with its more than 700 pages and reads in the preface that space limitations forbid elaboration in a treatise intended to serve merely as an *introduction* to the subject, one wonders how extensive a publication would be required to include the details which this volume introduces.

There is no question as to the value of these books as works of reference. The extensive bibliography alone is of exceeding worth, but however interestingly they may be written the number of readers is bound to be limited.

N. W. LARKUM

Sleep. Why We Need It and How to Get It—*By Donald A. Laird and Charles G. Muller. New York: John Day,* 1930. 214 pp. Price, $2.50.

The presentation of the material recorded by these authors represents an interesting experiment in bringing the results of scientific experimentation before the general reader in such form that it challenges his interest. The sub-title and chapter headings use the terms of our everyday language and are arranged in approved attention arresting phraseology. The short snappy sentences serve as excellent stimulation to counteract the soporific nature of the subject matter so that at no time is there any tendency for the attention to lag, and although not " primarily adventure or detective " cannot be used as suggested by its authors in the chapter, " When It's Hard to Get to Sleep."

The recommendations included in Part IV, based on the results of their scientific experiments, assume a form of expression calculated to arouse determination to follow them out to the letter. Anyone with an introspective or reflective turn of mind would find this fascinating reading, and one feels urged to recommend the whole book. The instructions for obtaining relaxation are found detailed and simple. One wonders if following them would be sufficient to bring about a degree of relaxation in those who really need it. To one who has never had any difficulty in getting to sleep, or in remaining asleep, the entire book sounds plausible and the instructions reasonable.

To one accustomed to reading descriptions of experiments in the classical form, with detailed description of apparatus and procedure, the book is likely to give the impression of being an interesting record of facts incompletely supported by experiments. This criticism has apparently been anticipated in the introduction. Unlike most books covering scientific subjects in a popular manner, the subject matter is so presented that one has the same stimulus and the same interest in knowing whether these experiments have been performed by others and the results confirmed or contradicted.

Although the experimenters seem to have provided for a percentage of error due to the human equation in the use of the special type of " guinea pig," one would like to know the results of others

in the same field. There is some adherence to the form of scientific presentation in that the work starts out with a review of theories held in the past, with references to literature and the description of typical experiments given in the appendix. The bibliography itself is of no small value.

While the book makes no claim to consideration as a medical treatise, one who is forced to think of it from that point of view is impressed by the lack of any reference to possible physical disorders as a cause of insomnia, and the importance of eliminating these, or of seeking appropriate medical attention before following the advice given.

One also wonders why anyone who appears to have had extensive training in the fields of biology, psychology and education, but without medical training, should be described as having engaged in "psychiatric testing," whatever that may be.

The book is published in convenient, attractive form and the type so arranged that it is pleasing and restful to the eye. It seems particularly timely, when communities are becoming aware of the tremendous amount of unnecessary noise. HELEN P. LANGNER

The New Evolution, Zoogenesis—*By Austin H. Clark. Baltimore: Williams & Wilkins,* 1930. 297 pp. Price, $3.00.

In reviewing this book, one is confronted at the start with a controversial question. The question is not only controversial as to the actuality of evolution, but more especially as to the mode. Evolution at best is not accepted by millions of laymen, and to come forward with a "New Evolution" is likely to confuse rather than to clarify. Again, to advertise the book as being "As Epochal as Darwin" is to lend prestige indeed.

Despite the foregoing, the book is extremely interesting, and was written by one of America's leading scientists. The point is made by some that the author's chief work has been among the crinoids, but we fail to see how this prevents him from being a good evolutionist. This reminds one of an occasion when one of our leading entomologists was visiting in Italy where he was introduced as "an American entomologist who knows something about biology." As if knowing something about biology were beyond the average entomologist! No special field of biology has a monopoly on knowledge of evolution, and as Dr. Clark's contributions have been in many corners of the biological world he cannot be charged with being a narrow specialist. From this broad touch he has brought a multitude of facts portrayed in such manner as to be easily understood by the average reader.

The outstanding point Dr. Clark makes is, in his own words: "Life in its very first beginnings developed at once and simultaneously from the primitive single cell in every possible direction, giving rise to some original form or forms in every phylum. So at its very first appearance animal life assumed essentially the same form as that in which we know it now so far as the phyla or major groups of animals are concerned" and "No matter how far back we go in the fossil record of previous animal life upon the earth, we find no trace of any animal forms which are intermediate between the various major groups. . . ."

If the absence of connectant forms in the geological record is a stumbling block, with reference to the affinities of the major groups, how does Dr. Clark relate the fishes, amphibians and reptiles with his "primitive single cell"? These three groups, to say nothing of many other higher vertebrate animals, do not extend back beyond the paleozoic, yet there is a vast expanse of time between the paleozoic and the time when life first arose.

It is a bit unfortunate to say "there

is not the slightest evidence that man is descended from an ape," because there is no real controversy here, but the lay reader would be justified in assuming that there is one. The present data as to man's zoölogical relationship have to do largely with certain fossil forms found in various parts of the earth. Among these are the "southern ape" of South Africa, the "Java ape-man," the Piltdown man of England, the Heidelberg man that comes from the second interglacial period, and the Neanderthal man of the third interglacial period, the last resembling man so closely that it is placed in the same genus under the name of *Homo neandertalensis*. With reference to this creature, Dr. A. S. Romer, of the University of Chicago, says: "He is a man, in the broad sense, but a man with the mark of the ape upon him." Romer believes that this Neanderthal man and our species had a common Asiatic (or African) ancestor. The point is, man *did* have an ancestor that was different from man's present state; so who cares whether he was an ape or a baboon?

Although this book is crowded with interesting facts, we suggest, for the lay reader, that it be preceded by some book written more from the standpoint of an introduction to the subject of evolution in its various forms. C. F. ADAMS

The Principles and Practice of Hygiene—*By Dean Franklin Smiley, Adrian Gordon Gould and Elizabeth Melby. New York: Macmillan,* 1930. 415 pp. Price, $2.50.

Although not indicated in the title, the preface and the context make it clear that this book is intended chiefly for nurses. We agree entirely with the authors' statement concerning the importance of health instruction in the nursing curriculum. It is perfectly true that nurses have opportunities enjoyed by no other class, physicians not excepted, for teaching the principles of hygiene and good living. The necessary exposure which every nurse must incur makes her own protection important, and this personal phase is emphasized. The authors also feel that the nurse should know how and what to teach for the foundation of health.

Looked at from the points of view enumerated, the book is adequate. In some respects it lacks balance. Immunity, including the various vaccines, is given only 14 pages, and this is all that is said about 11 diseases, including such important ones as diphtheria, scarlet fever, meningitis, smallpox, and measles. Less than two lines are given to rabies, and one would suppose from the statement that the vaccine was produced by growing the organisms at unfavorably high temperatures, or in weak antiseptic mediums. Since the curriculums of many schools of nursing are woefully deficient in time given to bacteriology and the methods of its presentation, we believe that this chapter is inadequate. Each chapter ends with a summary which we fear will conduce to laziness, since the student will read this only. However, it is a useful feature where rapid reference is desired.

The book is well printed and made up. The illustrations are sufficient and good. Altogether, the book can be thoroughly commended in its class.

M. P. RAVENEL

Pioneers of Public Health. The Story of Some Benefactors of the Human Race—*By M. E. M. Walker. With Foreword by Sir Humphrey Rolleston. Edinburgh and London: Oliver and Boyd,* 1930. 270 pp. Price, $5.00.

A book of this type inevitably brings to mind the *Psalm of Life*. Biographies are always interesting and generally useful. The question of selection of subjects comes foremost. The scientists of whom the author writes were suggested by the fact that their names are in-

scribed on the walls of the new building of the London School of Hygiene and Tropical Medicine. Of 21 men, 12 are British, 4 from the United States, 3 from Central Europe, and 2 from France. There can be no fault found with the selections as far as they go, though one might well wish that other names had also been included.

The volume begins with Thomas Sydenham, "the English Hippocrates," and, as the author suggests, some might have preferred that it be headed by Hippocrates himself.

Due credit is given to the laymen, Chadwick in England, and Shattuck in America, who did so much to show the evil effects of poverty and poor health and the necessity of rational preventive medicine. We believe also that the author has done well to confine his list to those who have been dead long enough to allow a critical world to weigh justly their merits.

The weakest biographies in the book are those of the Americans. One would suppose, for example, that General Gorgas accepted the work of Reed at once, yet "his conversion was slow," and he did not begin anti-mosquito work until two months after General Wood's General Order No. 6, December 21, 1900. He persisted in the disinfection of beds, clothing, etc. until the middle of August, 1901, though orders had been issued by Colonel Havard, Chief Surgeon, in April, for its discontinuance. The first attempts at controlling yellow fever in Havana by cleaning the streets, patios and buildings were not successful, and after the thorough cleaning up, one of the most severe epidemics of recent years took place. Carlos Finlay had said that the work was along the wrong lines, and only measures against the mosquito would give the desired results. It took the epidemic to convince those in charge of the truth of this statement.

It is to be regretted that a book published in 1930 should perpetuate the fallacy put forward by Noguchi in 1918, concerning the causative organism of the disease. In view of the work of the Commission on Yellow Fever under the auspices of the International Health Division of the Rockefeller Foundation, and others, there seems to be no excuse for this.

There are also a number of minor errors, particularly in the biographies of the Americans, in the spellings of names and positions occupied. The old term "stegomyia fasciata" is retained for the yellow fever mosquito.

The book is delightfully written. There is not a page that does not hold the attention. The illustrations are excellent and the printing and make-up of high quality. M. P. RAVENEL

Elementary Materia Medica, Including Drugs and Solutions—*By Walter W. Kruger, Ph.B. Philadelphia: Saunders,* 1929. 278 pp. Price, $1.75.

Among the many elementary textbooks on the market, the one under review ranks with the best. The material treated, and the manner of its arrangement, constitute the development of a course given to nurses during the past six years.

In addition to a very proper historical and theoretical background, the practical application of all facts presented is held of first importance, and rightly so. It is one thing to know something about elementary materia medica and solutions; it is another one to be able to apply this information.

There are 20 chapters, an appendix and an index. Each chapter is concluded with a set of questions and a brief bibliography, while chapters 19 and 20 consist wholly of "Problems for Review" and "Laboratory Exercises and Demonstrations." The appendix is a "General Bibliography" of the more important works bearing on the subject.

The most usable chapters consider such subjects as pharmaceutical preparations, arithmetic review, weights and measures, solutions, preparation of solutions, antiseptics and disinfectants, doses and their preparation and the administration of medicines, although various other subjects are quite adequately treated.

The book is reasonably free from errors, fairly well illustrated and, upon the whole, a very useful publication on elementary materia medica.

C. F. ADAMS

The Human Factor in Industry—*By E. P. Cathcart, C.B.E., M.D., F.R.S. New York: Oxford University Press*, 1928. 105 pp. Price, $1.75.

The several chapters of this small book are based upon two series of lectures given in the Engineering Department of Glasgow University. "We are still far from the day envisaged by Butler in *Erewhon* when man will be reduced to the status of a mere 'machine-tickling aphid.'" Man must always be variable in every calculation involved in industrial production. He is not a machine but a sentient being.

The five chapters are devoted respectively to physiological considerations (in industrial relations), fatigue and monotony, alleviation of fatigue, environmental factors (in fatigue), and industrial personnel. There is also an Appendix upon "The Living Wage," and an appended Bibliography for each chapter. A great majority of the illustrative instances used in the text have been taken from the Reports of the Industrial Fatigue Research Board.

In the average workshop the hardest work is most often done by the worst paid worker whose mechanical efficiency cannot possibly exceed 20–25 per cent of his caloric intake. The pure brain worker apparently requires no additional intake to cover the expenditure of mental energy. Man is really a "psychic chameleon," relatively few really thinking, and most taking their ideas second-handed. The complications of this situation are subjects of interesting physical and mental analysis.

Numerous short tables and diagrams serve to illustrate the economic side of human efficiency at work. At present, selection tests are often ludicrous: in the case of 6 managers interviewing 36 candidates for posts, 1 was rated as number 1 and 32, and another as 3 and 30, in their respective estimations. In short, important factors concerned with industrial fatigue and their practical solution in industry compose the theme of discussion throughout the book. There are many American as well as Continental citations of the author's theme and conclusions.

The book is a very readable and concise discussion, by a leading physiologist, to a non-medical audience, and is also valuable as a source book of recent facts, theories, and experiences.

EMERY R. HAYHURST

The Bacteriophage and Its Clinical Applications—*By F. D. d'Herelle. Springfield, Ill.: Charles C. Thomas*, 1930. Price, $4.00.

Each chapter in this book corresponds to one of the Lane Lectures delivered at Stanford University, October, 1928. It is addressed especially to practitioners of medicine, and presents the perplexing problem of these infracellular particles.

The revolutionary views of the author can be seen from the following quotation (p. 6):

> The cellular theory of life is manifestly false, for life is an attribute of infracellular particles. The antibodies play no part in the phenomena of recovery. The form and the properties of bacteria are inherently variable characters.

He presents the reasons for and against the living character of the bacteriophage corpuscle, holding that the

bacteriophage is a corpuscle (micellum) possessing autonomy; has its own characters which it transmits to its descendants, and is completely independent of the bacterium at the expense of which it multiplies. It possesses powers of adaptation. It secretes a lysin, and thus has the same agency for assimilation as other living beings. If adaptation, assimilation and multiplication define life, why, then, can it be maintained that the bacteriophage is not a living being? Philosophically, the author answers (p. 97):

> We do not yet know what life is, that is to say, as yet we have not succeeded in identifying the physico-chemical property which confers upon the protoplasmic micella the faculty of assimilation.

The results thus far obtained with bacteriophage therapy in infections of the enteric tract and in those due to the organisms of the enteric group are summarized as: (1) specific for bacillary dysentery; (2) specific for Asiatic cholera; (3) of little value in the typhoid and paratyphoid fevers; (4) highly effective in acute colon; (5) promising in infantile diarrheal conditions and in enterocolitis; (6) upon the basis of a limited experience appears effective in sprue.

Three factors appear to play an important rôle in the effectiveness of bacteriophage treatment: virulence of the phage, mode of administration, and time of treatment. A disregard of these seems to account for at least some of the failures.

The action of the bacteriophage can be stated as resulting in: the dissolution of the bacteria; enhancement of opsonic power, a refractory state of more or less duration in the host due to the bacterial proteins of the disintegrated bacteria. It induces modifications of the characters of bacteria, whenever it establishes symbiosis with a bacterium, though these seem to occur in an apparently irregular fashion. The author claims that bacterial mutations are produced exclusively through the action of the bacteriophage.

The author points out the importance of bacteriophagy to pathology, immunology, epidemiology and hygiene. Its study will not only force a new appraisal of theories, but will initiate research and hope in a cure for diseases, especially of the persistent chronic type, e.g., tuberculosis.

The reader who is interested in studying further the problems of bacteriophagy can find much more material in the detailed account by d'Herelle, *The Bacteriophage and its Behavior*. In it he will also find references to the work of the authors referred to in this book.

ESTHER W. STEARN

Pettibones Physiological Chemistry —*By J. F. McClendon, Ph.D. St. Louis: Mosby*, 1929. 368 pp. Price, $3.75.

This fourth edition of Pettibones textbook has been developed from the course in physiological chemistry as given in the Medical School at the University of Minnesota. It is intended as an intermediate test covering both the theoretical and practical laboratory work in physiological chemistry, as taught at Minnesota, and has been revised and brought up to date by McClendon.

R. W. PRYER

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

Syracuse, N. Y.—A table of contents, an index, and numerous charts and graphs make easy the study of the annual report of the Department of Health for 1929. The estimated population of 201,645 establishes Syracuse as the fourth largest city in New York State, with a 1929 birth rate of 21.0 and a crude death rate of 13.0. The infant mortality rate of 55.7 and the tuberculosis death rate of 57.5 were the lowest ever attained in the city.

The Health Department appropriation for 1929 was $293,000 ($1.47 per capita), of which $33,000 was received from the Milbank Memorial Fund. The diphtheria immunization campaign, begun in 1923, has resulted in protective treatments being given to 27,372 children. Only 19 deaths have occurred from diphtheria in the past 5 years.

New cases at the well baby clinics in 1928 were 1,125, with 6,854 clinic visits, more than one-half being brought to the clinic before the child was 3 months of age. The summer round-up of children expecting to enter school in September has necessitated the employment of additional physicians, making possible 9 preschool clinics a week.

Chelsea, Mass.—The 1929 annual report of the Board of Health of Chelsea is made up primarily of tabular material. Based on an estimated population of 47,247, a death rate of 11.72 per 1,000 living, exclusive of stillbirths, is recorded. Corrected for residence, the rate is lowered to 6.77.

During the year a milk regulation was passed requiring that all raw milk, offered for sale in the city, be from tuberculin tested and accredited herds, or tested herds on the way to accreditation under state and federal supervision; that it be certified by a medical milk commission in a manner required by law; that when offered for sale it shall contain not more than 10,000 bacteria per c.c.; and that all milk not meeting these requirements be pasteurized.

Of 11,049 defects found in examining school children, 5,017 were corrected during the school year 1928–1929.

Schenectady, N. Y.—The health activities for the year ended October 31, 1929, are portrayed in a gray covered report of 45 pages. This city with an estimated population of 95,849 reports 140 more deaths during 1929 than in 1928, or an increase in the rate from 10.96 to 12.33 per 1,000. Heart disease and cancer, with increases of 32 and 18 respectively, accounted for one-third of this increase. Pneumonia followed with 29 deaths, influenza 21, tuberculosis 7, and automobile accidents 7. A birth rate of 17.52 per 1,000 and an infant mortality rate of 72 are recorded.

The supervisor of nurses, in her report to the health commissioner, states that for a long time there has been need for more nurses to do clinic work as well as work in the district, and that this need has been particularly urgent in the tuberculosis division.

The Committee on Tuberculosis and Public Health came to our aid and in July appointed a nurse to help reorganize this division. The old files were gone over and many old cases were again taken up. All cases that had been reported during the past 10 years were investigated and all contacts, especially children, were asked to have an examination, either by their own family physicians or at the health center. One of the real needs at present is a preventorium for children who are not in good physical condition and yet are not tuberculous.

A modern abattoir has been con-

structed during the year where animals may be slaughtered under more cleanly aseptic surroundings, and the meat carefully inspected, and stamped before being offered for sale to the public. A veterinarian has been added to the health department staff.

An increase is shown in the amount of milk sold daily in the city, approximately 4,500 quarts being consumed, more than one-half of which is delivered to homes. Eighteen hundred half-pints of milk are delivered daily to the schools in the city.

Worcester, Mass.—During 1929, Worcester showed considerable progress along health lines, according to the annual health department report. Sanitation has been improved since the completion of a new Decarie type plant for the incineration of rubbish. Finances have been appropriated for the purpose of adding a new wing containing 100 beds to the tuberculosis ward of Belmont Hospital. This addition will provide further accommodation for persons with incipient tuberculosis, and also will meet the requirements of the State Department of Health.

In general, the number of cases and deaths from communicable diseases has decreased. Diphtheria has dropped from 309 cases with 28 deaths in 1925 to 108 cases with 6 deaths in 1929, while scarlet fever has decreased from 631 cases with 16 deaths in 1924 to 311 cases with 2 deaths in 1929. The birth rate for the city during the year was 19.50, the death rate, corrected for residence, 10.08, and the infant mortality rate 61.55.

Preschool work, which includes the diphtheria immunization clinics and summer round-up clinics for children about to enter school in the fall, shows continued progress, as does the work with children of school age. An additional dental hygienist has been appointed, who will be available for class instruction under the supervision of the dentists. Interspersed throughout this report are barred diagrams in black and white, which not only supplement the text, but add to the attractiveness of the report.

Wood County, W. Va.—The annual report of the Wood County, W. Va., Health Department is a concise, well assembled and very readable one of 16 pages. The department personnel consists of a health officer, 2 inspectors, bacteriologist, county health nurse, and clerk. The per capita cost of public health work is 24 cents.

Dairy herds are tuberculin tested once a year. All milk and milk utensil handlers are examined. Of the milk samples examined, 76 per cent gave counts less than 100,000 bacteria per c.c. Inspections of dairies and other food handling places totaled 592, other sanitary inspections totaling 585.

Immunization treatments against disease were as follows: anti-typhoid 700, antismallpox vaccinations 600, toxin-antitoxin 4,200, diphtheria antitoxin 17, antirabic 2. School examinations, made as often as possible, are somewhat limited because of severe weather and distance. The number of schools visited by the physician and nurse was 193, in which 3,496 pupils were inspected; 1,567 being examined by a physician. Examination results with accompanying suggestions are sent to the parents, personal contacts being impossible because of the lack of personnel. Of the 15,000 defects found, 750 were corrected.

Thirty preschool conferences were also held. At least one venereal disease clinic is held each week, the average attendance being 30.

Marion County, Ore.—The Marion County Health Unit has prepared an attractive 35 page report for 1929, which shows the organization to be com-

posed of a health unit committee of 8 members, a health officer and deputy, a school dentist, 8 staff nurses and 1 supervisor, milk and food inspector, sanitary inspector, and 2 office clerks. The total appropriation for health during the year 1930 was $40,175, or $.80 per capita. Local funds will total $30,985, an increase of $8,200 over 1929, while the remainder will be spent by the Commonwealth Fund.

The death rate for Marion County in 1929 was 13.1 per 1,000 population, the birth rate, 15.6. The 1929 infant mortality rate was 39.7 per 1,000 live births, as compared with 48.0 for the state of Oregon. The tuberculosis death rate for 1929 was 40.0 per 100,000 population. The county for the same year experienced no deaths from smallpox, 1 from diphtheria, 2 from measles, 1 from typhoid, and 382 from the so-called degenerative diseases. No deaths occurred from scarlet fever. A special survey was made to locate tuberculosis cases and contacts, in which the physicians in the county coöperated in early reporting, and a weekly chest clinic has been effective.

With the passage of a suitable milk ordinance in 1928, considerable progress has been made toward enforcement and in assisting in improving milk quality. By January 1, 1930, 83 per cent of milk sold in Salem was pasteurized, and all raw milk showed a bacterial count of less than 50,000. Inspection of highway tourist camps is a sanitary task here as elsewhere. In addition to 32 such tourist camps, over 100 other temporary camps, maintained by berry and hop growers, required supervision. The A. P. H. A. appraisal score for Marion County for 1928 was 754 out of a possible 1,000, a gain of 49 points over 1927.

BOOKS RECEIVED

TROPICAL MEDICINE. By Sir Leonard Rogers and John W. D. Megaw. Philadelphia: Blakiston, 1930. 536 pp. Price, $5.00.

STALKERS OF PESTILENCE. THE STORY OF MAN'S IDEAS OF INFECTION. By Wade W. Oliver. New York: Hoeber, 1930. 251 pp. Price, $3.00.

MENTAL HYGIENE. By Ernest R. Groves and Phyllis Blanchard. New York: Holt, 1930. 467 pp. Price, $4.00.

A WORLD PANORAMA OF HEALTH EDUCATION. American Child Health Association and The Metropolitan Life Insurance Co. New York: 1930. 256 pp. Price, $.50.

RIDERS OF THE PLAGUES. THE STORY OF THE CONQUEST OF DISEASE. By James A. Tobey. New York: Scribner, 1930. 348 pp. Price, $3.50.

THE FIRST YEAR OF LIFE. By Charlotte Buhler. New York: John Day, 1930. 281 pp. Price, $3.50.

CHILDREN OF THE COVERED WAGON. By Estella Ford Warner and Geddes Smith. New York: Commonwealth Fund Division of Publications, 1930. 123 pp. Price, $1.00.

THE STATE HEALTH DEPARTMENTS OF MASSACHUSETTS, MICHIGAN, AND OHIO. WITH A SUMMARY OF ACTIVITIES AND ACCOMPLISHMENTS: 1927–1928. By James Wallace. New York: Commonwealth Fund Division of Publications, 1930. 192 pp. Price, $1.50.

STEDMAN'S MEDICAL DICTIONARY. (11th rev. ed.) By Thomas Lathrop Stedman. New York: Wood, 1930. 1222 pp. Price, $7.50.

MOLDS, YEASTS, AND ACTINOMYCETES. A HANDBOOK FOR STUDENTS OF BACTERIOLOGY. By Arthur T. Henrici. New York: Wiley, 1930. 296 pp. Price, $3.50.

TOBACCO. By Dr. Walter L. Mendenhall. Cambridge: Harvard University Press, 1930. 69 pp. Price, $1.00.

HYGIENE. A COLLEGE TEXTBOOK FOR NON-MEDICAL STUDENTS. By R. C. Whitman. New York: Wiley, 1930. 327 pp. Price, $2.50.

ARTIFICIAL SUNLIGHT, COMBINING RADIATION FOR HEALTH WITH LIGHT FOR VISION. By M. Luckiesh. New York: Van Nostrand, 1930. 254 pp. Price, $3.75.

AN INTRODUCTION TO MALARIOLOGY. By Mark F. Boyd. Cambridge: Harvard University Press, 1930. 437 pp. Price, $5.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

Enuresis Studies—An exhaustive research in the psychiatric aspects of enuresis, dealing with age, sex, physical, pathologic and social factors as related to this condition.

ANDERSON, F. N. The Psychiatric Aspects of Enuresis. Am. J. Dis. Child., 40, 3: 591 (Sept.), 1930.

Maternal Hygiene Standards—Excerpts from a committee report with the recommendations for prenatal care given in full.

ANON. Standards for Maternity Care. Child Health Bull., 6, 5: 146 (Sept.), 1930.

Psittacosis—An excellent statement of what is known of the epidemiology, infectivity, diagnosis, prognosis and prevention of this unusual disease.

ARMSTRONG, C. Psittacosis: Epidemiological Considerations with Reference to the 1929–30 Outbreak in the United States.

Dental Caries—Diet including green vegetables, fruit and milk and low in sugar is inhibitive to dental caries. Is this the result of a decrease in aciduric bacteria in the mouth, the increase in salivary alkalis or the hardening of the teeth? The underlying theory is less important than the practice.

BUNTING, R. W., *et al.* The Problem of Dental Caries. Am. J. Dis. Child., 40, 3: 536 (Sept.), 1930.

Milk-Borne Epidemics—Reporting the occurrence of milk-borne epidemics from 1924–1929, 44 new outbreaks are added to the 214 recorded in the previous 5 years; an unenviable record.

CRUMBINE, S. J. Milk-Borne Epidemic Diseases in the United States and Canada Reported by the State and Provincial Health Authorities, 1924 to 1929. Child Health Bull., 6, 5: 157 (Sept.), 1930.

Arthritis Symposium Continued—The excellent symposium on arthritis (reported in the September Bibliography, q.v.) is extended to cover additional subjects in the diagnosis and treatment of this condition. Together, the two installments form a most inclusive and authoritative discussion of this important field of public hygiene.

CECIL, R. L., *et al.* Symposium on Arthritis —Continued. J. Lab. & Clin. Med., 15, 12: 1177 (Sept.), 1930.

Diphtheria Distribution—Evidence is presented showing that variation in diphtheria prevalence is associated with dosage and host-resistance. Examples are also given in which the determining factor is obscure. An excellent dissertation.

DOULL, J. A.. Factors Influencing Selective Distribution in Diphtheria. J. Prev. Med., 4, 5: 371 (Sept.), 1930.

Effects of Tonsillectomy—A 10-year follow-up study indicates that tonsillectomy reduces the chances of sore throat, scarlet fever, diphtheria and rheumatic fever, has no beneficial influence on the incidence of head colds, and that respiratory infections such as laryngitis, bronchitis and pneumonia occur more frequently in tonsillectomized children.

KAISER, A. D. Results of Tonsillectomy. J. A. M. A., 94, 12: 837 (Sept. 20), 1930.

Cancer of Lip and Tongue—The author discards smoking as the cause of cancer about the mouth; she discounts the influence of syphilis; and leaves the jagged tooth theory suspended.

LANE-CLAYPON, J. E. Cancer of Lip, Tongue and Skin. Ministry of Health (British) Reports on Public Health and Medical Subjects, No. 59, 1930.

School Health Programs—An excellent picture of a unified health program including school sanitation, physical education, health instruction and health supervision at an estimated minimum cost of $7 per child. The aims—less illness, greater efficiency and happiness.

KEENE, C. H. A Program for School Health. Pub. Health Nurse, 22, 9: 444 (Sept.), 1930.

British Health Service Opportunities—A frank statement of the possibilities for a career in the public health service precedes an outline of the educational requirement for the D. P. H. in Great Britain.

KERR, H. The Public Health Service as a Career. Med. Off., 44, 10: 97 (Sept. 6), 1930.

Mental Hygiene in Toronto—How mental hygiene is incorporated in the work of the public health nurses of the Toronto Department of Public Health is well told in a paper discussing the broad issues of mental health.

LEWIS, E. P. Mental Health. Pub. Health Nurse, 22, 9: 458 (Sept.), 1930.

Preventing Diphtheria in Lowell—How 25,000 children in Lowell were immunized at an approximate cost of 7 cents per child is recorded in painstaking detail.

MCNAMARA, J. J., and SULLIVAN, G. M. Diphtheria Prevention in Lowell, 1928 and 1929. New Eng. J. Med., 203, 9: 413 (Aug. 28), 1930.

More About Rheumatism—Still another symposium on rheumatic fever, this time a British discussion.

MILLER, S., *et al.* Rheumatism in its Public Health Aspects. Pub. Health 43, 12: 377 (Sept.), 1930.

Dietary Facts and Fancies—A useful review of dietary knowledge exposing the food faddists.

STONE, W. J. Dietary Facts, Fads and Fancies. J. A. M. A., 95, 10: 709 (Sept. 6), 1930.

Status of Scarlet Fever Prophylaxis—Nothing new is reportable to change the attitude of the conference of state and territorial health officials expressed in 1926, to wit: the Dick test is a fairly dependable indication of the immunologic status; scarlatinal streptococcus toxin will immunize susceptible individuals; the value of antitoxin for passive immunization is not sufficiently proven.

VELDEE, M. V. The Present Status of Streptococcus Biologic Products in the Prevention and Treatment of Scarlet Fever. Pub. Health Rep., 45, 32: 1827 (Aug. 8), 1930.

Silver Polish Poisoning—A number of cases of poisoning thought to be due to foods were later found due apparently to the use of tableware on which a cyanide silver polish had been used. This leads to the warning against the use of polishes containing this material.

WILLIAMS, H. Cyanide Poisoning, Acute and Non-Fatal, Apparently from Hotel Silver Polish. J. A. M. A., 94, 9: 627 (Mar. 1), 1930.

Cultural Characteristics of Diphtheria Bacilli—"Smooth (colony) virulent, toxic diphtheria bacilli are transformed to non-virulent, 'R' (rough colony) forms in the throats of patients during convalescence." Vaccination of carriers of the smooth colony forms with an "S" vaccine is suggested.

YU, H. A Study on the Dissociation of the Diphtheria Bacillus. J. Bact., 20, 2: 107 (Aug.), 1930.

NEWS FROM THE FIELD

WISCONSIN MEDICAL SOCIETY

AT the meeting of the State Medical Society of Wisconsin, September 9–11, Dr. C. A. Harper, State Health Officer, was elected President. At the annual banquet, Dr. A. W. Rogers, in the name of the society, presented him a gold medal in the following words:

A son of Wisconsin, a practicing physician since 1894, appointed to the State Board of Health in 1907 by Governor La Follette and serving continuously since with no appointments from Governors Davidson, Philipp, Blaine and Kohler; for your twenty-nine years of membership on that Board, twenty-seven years as Secretary, for your closer vision, for your careful and untiring work in the interests of all people as Health Officer of this state, and for your service as a councilor and officer of your State Medical Society, we, your fellow members, give you this seal of our Society as a token of your achievements, and our esteem and affection.

ARGENTINA ESTABLISHES A "MODEL INSTITUTE OF MATERNAL AND CHILD HYGIENE"

THE President of the National Department of Hygiene of Argentina has recently ordered the establishment of a "model institute of maternal and child hygiene."

The institute will have a practical school for the training in child care of physicians, nurses and dietitians.

It will also provide continuation courses for physicians who are in charge of child health centers, and will organize traveling centers for maternal and child hygiene in the rural districts of the country.

WEST VIRGINIA NURSES

OCTOBER 23–25, the State Nurses Convention met in Fairmont, W. Va., and many interesting papers were presented.

NURSES' GRADING STUDIES

IN her paper entitled "The Student's Share," May Ayres Burgess has presented, through graphs, the amount of time spent by the student in the various nursing services. This appears in the October issue of the *American Journal of Nursing*.

ROENTGEN PIONEER

DR. Christian Deetjen, pioneer in the study and use of the Roentgen or X-ray, had his right arm amputated at the elbow as a result of his medical research. This is reported to be the eighth operation he has undergone due to his research work.

LUNG MACHINE

PHILIP Drinker, A. P. H. A. member, of Harvard, has invented a respirator, an airtight metal box mounted on wheels, big enough to contain a man, leaving his head out. Its purpose is to prolong artificial respiration beyond the period possible by manual methods. It was demonstrated recently before a delegation of police and fire surgeons in Boston.

STANDARDS FOR MATERNITY CARE

A REPORT has just been published on Standards for Maternity Care, prepared by the Committee on Maternity Care of the Children's Welfare Federation and a Committee appointed by the New York Obstetrical Society. This is a 32-page booklet published by The Children's Welfare Federation, 244 Madison Avenue, New York, N. Y.

NURSING CALENDAR

THE National League of Nursing Education has prepared an attractive calendar for 1931. This includes unpublished pictures of Florence Nightingale's birthplace, the Villa Columbaia, in Florence. The price is $1.00 for a single copy, $.75 in quantities over 50. National League for Nursing Education, 370 Seventh Avenue, New York, N. Y.

MOTOR FATALITIES

DEATHS from automobile accidents in the United States in 1930 will probably total about 33,000, and there will be more than 100,000 accidental deaths in all. So Dr. Louis I. Dublin reported to the National Safety Council at its meeting in Pittsburgh on September 29.

PARROT HAS HEALTH CERTIFICATE

A PARROT was recently brought into the United States with four health certificates. It had been bought in Belgium, and one of the certificates was from the Belgian Government.

PERSONALS

KARL F. MEYER, PH.D., director of the Hooper Foundation for Medical Research, has been appointed chairman of the committee on undulant fever of the National Research Council.

DR. MARTIN J. LACEY has been selected as health officer of Albany, Calif., succeeding Dr. Jack L. Stein.

DR. LINDLEY H. ESHLEMAN has been appointed city health officer of Marion, Ind.

DR. FRANK L. WATKINS, director of health education in the public schools of Tulsa, Okla., was recently elected city-county health officer of Great Falls to succeed Dr. Thomas F. Walker. Dr. Watkins was formerly in charge of the Ohio Bureau of Vital Statistics and was affiliated with the Mississippi and Florida state boards of health.

J. H. SHRADER, PH.D., M.D., has been appointed Associate in the Department of Chemical Hygiene in the Johns Hopkins School of Hygiene and Public Health, to teach the course, Public Health Aspects of Food Production and Distribution.

DR. H. JACKSON DAVIS, who has been epidemiologist for the New York State Department of Health, has become Acting Health Commissioner of Cortland Co., N. Y., during the absence of Dr. Daniel R. Reilly, who, under a Rockefeller Foundation Fellowship, is taking a year's course in the Johns Hopkins School of Hygiene and Public Health.

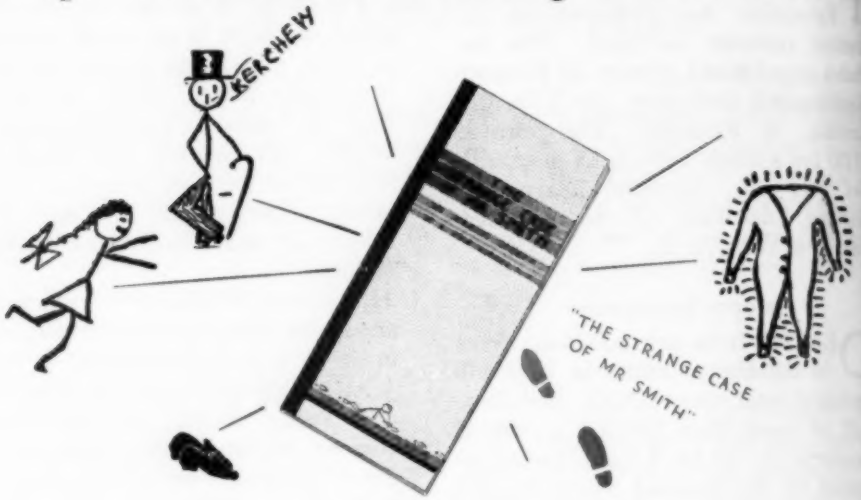
CONFERENCES

Oct. 30–Nov. 1, American Water Works Association, California Section, Annual Convention, Pasadena, Calif.

Nov. 19–22, White House Conference on Child Health and Protection, Washington, D. C.

Nov. 30–Dec. 6, Asociacion Medica Mexicana, Guadalajara, Jalisco, Mexico.

People who read this amusing little book should



Have Fewer Colds This Winter

When we refer to Mr. Smith's adventure as a *"case,"* we mean that Mr. Smith had a bad cold in the head.

In fact, as the author says, "Besides having a bad cold in the head, Mr. Smith also had a wife, Mrs. Smith, who also had a cold in the head, and a daughter, Elithabeth Thmiff, who thome-how alwayth had a code in the heb. . . ."

Yet, "the Smiths *always* wore their rubbers . . . they were *always* rubbing their chests with something . . . they *never* sat in a draught . . . and in cold weather all three wore their prickly underwear.

"So *how* did the Smiths get their colds?"

Whoever you are, health worker, teacher, mother or just ordinary citizen, we urge you to send for this highly amusing yet thought-provoking little booklet. Find out as the Smiths did how you get your colds . . . or how you may help others to take the precautions that they should.

Here is excellent early-winter reading for anyone. So mail the coupon promptly for your *free* copy of "The Strange Case of Mr. Smith." (Additional copies by special request or at cost.)

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